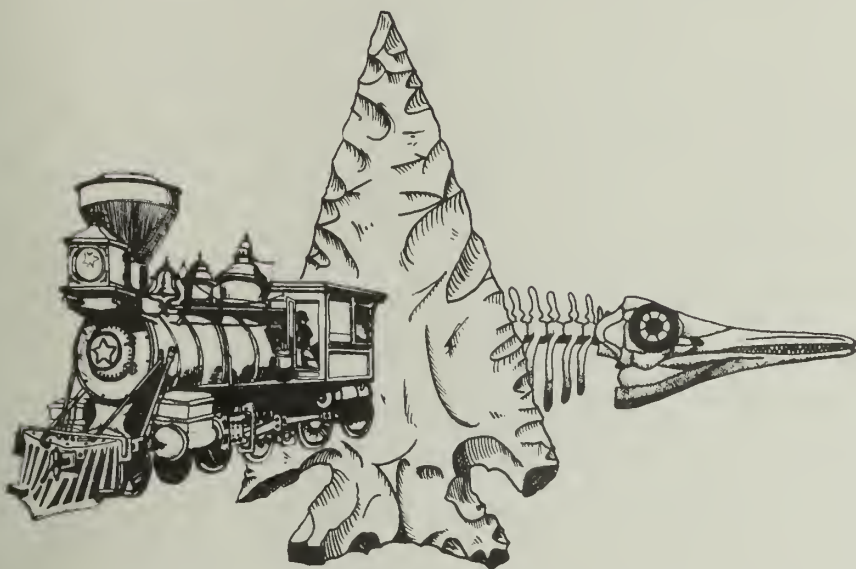




BUREAU OF LAND MANAGEMENT NEVADA



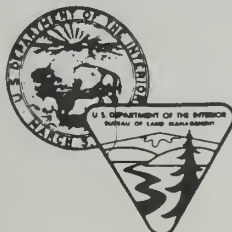
A Cultural Resources Overview of the Carson & Humboldt Sinks, Nevada

James C. Bard

Colin I. Busby

John M. Findlay

**CULTURAL RESOURCE SERIES No. 2
1981**



#9778686

10 88000257

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

E
78
.N4
E37
1981

A CULTURAL RESOURCES OVERVIEW OF THE
CARSON AND HUMBOLDT SINKS, NEVADA

FOR

DEPARTMENT OF THE NAVY
WESTERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
SAN BRUNO, CALIFORNIA

Contract No. N62474-79-C-5502

BY

James C. Bard, Colin I. Busby and John M. Findlay

WITH THE ASSISTANCE OF

Pamela Endzweig, Larry S. Kobori, John Liversidge and Scot Mende

SPECIALIZED APPENDICES BY

Larry S. Kobori and Karen M. Nissen

BUREAU OF LAND MANAGEMENT LIBRARY

Denver, Colorado



88000257

BASIN RESEARCH ASSOCIATES
Berkeley, California

May, 1981

TABLE OF CONTENTS

Table of Contents	i
Executive Summary	ii - viii
Acknowledgements	ix
INTRODUCTION	1 - 2
NATURAL SETTING	3 - 12
HISTORICAL SETTING	13 - 68
Chapter 1: Routes to the Pacific	13 - 31
Chapter 2: Settlers and Miners, 1860-1900	32 - 44
Chapter 3: The Myth and Reality of Conquering the Desert, 1900-1940	45 - 61
Chapter 4: Wildlife Management, Naval Aviation, and Water Rights: Government and the Humboldt and Carson Sinks, 1940-1975	62 - 68
ETHNOGRAPHIC OVERVIEW	69 - 114
ARCHAEOLOGICAL OVERVIEW	115 - 147
A History of Archaeological Research in the Humboldt and Carson Sinks, West-Central Nevada	115 - 134
A Cultural Sequence for the Carson/Humboldt Sink Area	135 - 147
SITE RECORDS ANALYSIS	148 - 151
PROPOSED PROJECT AND ALTERNATIVES - CULTURAL RESOURCE IMPACTS	152 - 153
REFERENCES CITED	154 - 187
APPENDIX A: Human Skeletal Remains from the Carson-Humboldt Sinks by L.S. Kobori	188 - 195
APPENDIX B: Collectors' Interviews by C.I. Busby and L.S. Kobori	196 - 198
APPENDIX C: Rock Art in the Humboldt and Carson Sinks by K.M. Nissen	199 - 214

EXECUTIVE SUMMARY

This report presents the results of a cultural resources literature/archive overview of the B-20 Air Warfare Range and surrounding region as commissioned by the U.S. Navy (USN) for its Environmental Assessment pursuant to the re-withdrawal of the range from the Public Domain for reasons of public safety. The format utilized is similar to the regional data syntheses required by the Bureau of Land Management (Department of the Interior) for their Class I Cultural Resources Overview.

The intent of this study is to provide the Facilities Engineering Command, USN with an overview and synthesis of the existing cultural resource information, including historic, prehistoric and ethnographic data available for the study area, in this case the B-20 Air Warfare Range and the surrounding region. The Navy, in cooperation with the Bureau of Land Management (BLM), the agency responsible for the public domain land within the range boundaries, is mandated by several federal laws and Executive Orders to consider the possible effects these actions may have on any cultural resources within a project area prior to development. The prime purpose of this overview is to provide a compilation and synthesis of data concerning any cultural resources present both on the B-20 Range and in the surrounding region that can serve as background information for the Environmental Assessment as well as contribute data for informed management decisions on the feasibility/suitability of the land withdrawal in view of the requirements of the Navy.

The data in this report are presented in terms of previous archaeological research, a culture history (or sequence), ethnography, ethnohistory, a narrative history and needs and recommendations for future management and protection of any cultural resources within the boundaries of the B-20 Air Warfare Range. This compilation and presentation of cultural resource information will, hopefully, encourage long term planning resulting in the conservation and protection of a non-renewable portion of America's heritage.

As defined by the USN, the B-20 Range is located 31 miles northeast of the town of Fallon, Churchill County, Nevada, within the boundaries of the Carson Sink. The proposed withdrawal will affect 19,680 acres of BLM controlled land (public land) and the purchase of 11,280 acres of Southern Pacific Land Company property now leased by the Navy. For the purposes of our overview, the B-20 Range is treated as a discrete locality within the boundaries of our defined study area, the Carson and Humboldt Sinks and vicinity. This arbitrarily defined area covers several million acres of variable terrain in Churchill and Pershing Counties, Nevada. It is bounded on the east by the crest of the Stillwater Range and Antelope Valley; on the south by Four Mile Flat, the northern slopes of the White Throne, Desert and Dead Camel Mountains; on the west by the crests of the Hot Springs Mountains and the Trinity Range; and on the north by the northern boundaries of the Upper Lovelock Valley and the West Humboldt Range.

The study area has a varied geological and geomorphological history marked by past pluvial, tectonic, volcanic and erosional activities. The region has recently been the scene of extensive geothermal exploration, with a pilot plant now operational at Brady Hot Springs. The extensive Carson and Humboldt Sink playas are the most outstanding natural features located in the study area. These were formerly inundated by Pleistocene Lake Lahontan and contain deep thicknesses of alluvial and lacustrine sediments. Situated in the rainshadow of the Sierra Nevada, the region has a mid-latitude arid climate marked by cold winters, hot summers and low precipitation.

Floristically the study area lies in the Northern Desert/Salt Desert Shrub Zone with the most widespread community being the Little Greasewood-Shadscale Association. At higher elevations and areas of greater moisture the Sagebrush Association is found while the extensive, low elevation playas are fringed by halophytic plant communities. A wide variety of mammals, reptiles, avifauna and insects are known for the area.

Holocene climatic data are somewhat sparse although a number of researchers have thoroughly studied the geochronology of Pleistocene Lake Lahontan and have noted supporting archaeological and paleobiological evidence for Antevs' tripartite Holocene climatic sequence. The study region offers excellent opportunities for continued research on Holocene climatic matters.

In many ways the history of Lovelock Valley and the Carson Sink typifies the general pattern of white attitudes toward the Great Basin. At first, the study area belonged to a large unknown region that represented a barrier to whites interested in westward expansion. Persistent exploration ultimately unravelled the mysteries of central and western Nevada, and whites began to carve routes through the area toward the Pacific coast. Starting with the emigrant trail, and later using the Pony Express and Overland Mail routes as well as the transcontinental railroad, whites continued to pass through the lower Humboldt River Valley and the Carson Sink. They generally held unfavorable opinions of the arid and rough terrain and saw little potential for further development. Similarly, they showed little regards for the native inhabitants of the region, clashing with the Indians and destroying traditional Native American means and ways of life. Only a small number of whites settled in the study area during the late nineteenth century, though more passed through while following the fortunes of mining in Nevada.

Around the turn of the twentieth century, attitudes toward the lands around the Humboldt and Carson Sinks grew more favorable. Whites still considered the environment less desirable than other regions of the Far West, but now they felt more confident about overcoming the aridity, poor soil and isolation of the study area. Their optimism and planning for the vicinity came to be expressed in the Newlands reclamation project, an expensive and complex effort to turn the Carson Sink and Lovelock Valley into productive farm land. The project, the first major intrusion by the federal government into the study area, enjoyed some success in creating additional land, overcoming the regional shortage of water, and establishing the new town of Fallon. However, it also became a source of tensions and disappointments for many. Only after World War II, when Carson Sink residents began to

understand the limits of the irrigation system, was the project viewed more positively. Yet, even that attitude was short-lived as controversy over the reclamation project increased again after 1950.

At the same time that residents of the region came to regard the Newlands project more favorable, other government sponsored programs came to the vicinity of the Carson Sink. Unlike reclamation, which was based on the assumption that the lands needed to be remade in order to be useful, these other activities presumed an appreciation of the lands as they were. The Auxiliary Naval Air Station at Fallon sought out the good flying weather and the wide open spaces of central Nevada, and conservationists sought to preserve the marshy wildlife habitat in Carson Sink. In these projects, whites did not view the environment as unsatisfactory for modern needs, as their predecessors in the study area had before them. Now, as in the rest of the Great Basin, the resources of the region have come to be valued highly, in sharp contrast to earlier perceptions of the land. The heightened respect for and interest in the land and water of Lovelock Valley and Carson Sink have generated serious and complicated controversy over a region in which few white Americans were originally interested, and have contributed to a reconsideration of man's relationship to the ecology in the Great Basin.

The historical investigation turned up no historic sites on the B-20 Air Warfare Range.

The Carson and Humboldt Sinks area has been the subject of a number of archaeological investigations over the past 70 years. The first serious scholarly archaeological investigation of record was the 1929 report on the Lovelock Cave excavations conducted by the University of California, Berkeley in 1912 and those in 1924 by the Museum of the American Indian. The main accomplishment of this research was the trial definition of the Lovelock Culture and its division into Early, Transitional and Late periods. Minor archaeological site survey and brief collecting projects were carried out in the 1920s as well. In 1929, Steward published his monograph on petroglyphs of the western United States which included mention of the petroglyph localities at Grimes Point in the Carson Sink.

In the 1930s, field parties from the University of California, Berkeley conducted the excavation of Humboldt Cave, which was later published in 1956 by R.F. Heizer and A.D. Krieger. Granite Point Shelter was also excavated in 1936 and some collections were made from the Humboldt Lakebed Site (NV-Ch-15). A site survey was conducted in both the Carson and Humboldt Sinks but overall archaeological research was sporadic and few major advances were made.

Except for several brief surveys and test excavations in the Carson Sink by the Wheelers, under the auspices of the Nevada State Park Commission, archaeological and anthropological research in west central Nevada was largely suspended during the Second World War and the years following its termination. R.F. Heizer's visit to Leonard Rockshelter in 1949 marked the overall rebirth of interest in the study region's prehistory.

The 1950s and 1960s saw a realization of the research potential of the

region through the concerted research efforts by the University of California, Berkeley and by other individuals and institutions. R.F. Heizer and others excavated Leonard Rockshelter, Granite Point Cave, NV-Pe-8; collected coprolites from Lovelock Cave; and conducted site and petroglyph surveys in the Humboldt Valley area in 1950. Leonard Rockshelter yielded the longest record of human occupancy in the Great Basin to that date. G. Grosscup, N. Roust and R. Morrison representing the University of California, Berkeley and United States Geological Survey respectively, excavated Hidden Cave in the Carson Sink and conducted a systematic site survey in the Carson Valley area in 1951. Leonard Rockshelter and Hidden Cave yielded vital information necessary for the 1956 chronological syntheses by Heizer for the Humboldt Sink and Grosscup for the Carson Sink. Research carried out in the study region at these, and other sites, resulted in the formulation of several regional culture historical sequences. The role of post-glacial climatic change on human adaptation and utilization of the region was also recognized and evidence from this area was crucial to the later modification of J. Jennings' Desert Culture hypothesis. Indeed, the Humboldt Cave publication in 1956 indicated a long standing lakeside ecological/cultural adjustment in contrast to a "desert adaptation." Interest in the function of prehistoric rock art was reflected by a statewide site survey which later resulted in a major monograph by Heizer and Baumhoff in 1962 with the thesis that petroglyphs were connected to ritual hunting magic.

In 1960, Grosscup published his Culture History of Lovelock Cave with a revised chronological sequence for the Lovelock Culture. In the early 1960s archaeological research in the study area was curtailed as interest shifted to other areas of the Great Basin. This period also saw increased interest in the problem of Early Man in the Great Basin and the search for undisputed evidence for his presence and lifeways.

The late 1960s saw a great deal of excavation (Lovelock Cave, NV-Ch-15, NV-Pe-67, Hanging Rockshelter), analyses (coprolites, artifacts, other paleobiological evidence), and cultural reconstruction (subsistence economy, settlement patterns, chronology) carried out in the study area by the University of California, Berkeley and the Nevada State Museum among others. Aside from a crystallization of the regional culture chronology, R.F. Heizer, L.K. Napton, N. Roust, R. Ambro and others through their coprolite analyses, were able to demonstrate the long standing lacustrine adaptation of human groups living in the Carson and Humboldt Sinks. The re-excavation of Lovelock Cave resulted in the firm dating of the Lovelock Culture, and the detailed examination of NV-Ch-15 led to the confirmation of the lacustrine subsistence pattern as reflected in lakeside settlements of a permanent or semi-permanent nature.

The 1970s witnessed a continuation of archaeological research in the study area by the University of California, Berkeley, the Nevada State Museum, and more recently, the University of Nevada, Reno and the American Museum of Natural History. These institutions and researchers have been primarily concerned with paleoenvironmental reconstruction, cultural ecology, refinement of regional culture chronologies as well as other problems of interest to archaeological science. However, the advent of environmental impact statutes and cultural resource management have

channelled a great deal of research time and effort towards conducting archaeological impact assessments and inventories designed to meet land managing agency needs. At present, a great deal of funding for archeological research originates from such agencies as the Bureau of Land Management, the Department of Defense and a number of private natural resource exploration/development firms. It is hoped that the 1980s will see a greater balance between academic or non-directed research and agency or other-directed projects.

From the various archaeological accounts available for the study area and from data in the surrounding regions, a tentative occupational history for man in the Carson and Humboldt Sinks has been developed. It is judged unlikely, after a review of the extant data base, that man inhabited the region prior to 10,000 B.C. (Pre-Projectile Point Horizon), although evidence from other surrounding areas may indicate the presence of "early man" in western North America. Man probably initially occupied the Carson and Humboldt basins ca. 10,000 - 9000 B.C. although the archaeological evidence for this early occupation (Fluted Point Tradition) is scant and subject to some interpretation. From ca. 9000 - 6000 B.C. cultural activities were probably confined to lakeshore adaptations with a generalized subsistence pattern emphasizing either lacustrine or megafaunal food resources (Western Pluvial Lakes Tradition). It is probable that neither resource was emphasized and that both were opportunistically exploited.

Perhaps as early as 6500 B.C. a basic hunting and gathering subsistence pattern, the Great Basin Archaic, was established. This lifeway is initially represented by the Humboldt Culture in the study area. During the Great Basin Archaic (5000/6000 B.C. - A.D. 500/600) ground stone food processing implements (e.g., manos, metates) apparently became common inferring the increased use of plant resources and increasing reliance on lakeside resources. Humboldt, Pinto, Silver Lake, Lake Mohave, Elko and Gypsum projectile points are characteristic of this period although Silver Lake and Lake Mohave points are also known to represent the Western Pluvial Lakes Tradition as well. The Leonard Culture or Carson Phase are thought to coincide with the Altithermal period in which the Humboldt and Carson Lakes were desiccated. Human response to this period of climatic change is seen as either abandonment or sparse habitation until around 2500 B.C. Evidence for this "hiatus" in occupation comes from Leonard Rockshelter and Hidden Cave.

The Lovelock Culture, divided into Early, Transitional and Late, begins around 2500 B.C. and is characterized by a successful lacustrine adaptation. Settlement was primarily in open, lakeside villages along with the occasional use of caves for specialized purposes or foul weather shelter. Components of this "culture" lasted until post-contact times.

The introduction of the bow and arrow is indicated by the transition from the larger, heavier projectile points of the preceeding periods with the appearance of the smaller and lighter Rose Spring and Eastgate points ca. A.D. 500 - A.D. 1000/1200 (Rose Spring-Eastgate Complex).

Cottonwood Triangular and Desert Side-Notched projectile points appear ca. A.D. 1000 to Historic times and mark the Late Prehistoric Complex or

Dune Springs Phase. The appearance of these point types also marks the entry of the Numic speaking peoples into the Great Basin in general and the study area in particular.

The aboriginal inhabitants of the study area have been identified as two Uto-Aztecan speaking Northern Paiute bands, the Toedokado and Kupadokado, occupying approximately 10,000 square miles of west-central Nevada. Pre-contact population estimates for the two bands center around 800 individuals each but there is wide disagreement on these figures. A population density for the area has been calculated at one individual per 6.4 square miles although the true density may be a good deal higher.

The Kupa and Toe bands, like other California and Nevada aboriginal groups, relied on a variety of seasonally available plant and animal species for their subsistence. Vegetal foods were obtained from the exploitation of a wide variety of seasonally available seeds, roots, greens and nuts. While pinenuts have been considered as an important staple food for these groups, there is considerable debate as to when and why they became a favored resource. Individual and communal hunting of jackrabbit, deer, antelope, mountain sheep, various waterfowl and a number of rodents contributed to the meat supply. A fishing industry, utilizing a number of capture methods, exploited the nearby lakes and rivers of both groups and their neighbors.

The basic level of the Toe and Kupa groups was the kin clique or extended family. These groups constituted the basic work unit in the system and the day-to-day interaction group for individuals. This group generally moved as a unit between the various resource areas. Their seasonal round followed a series of moves to resource areas based on the current availability of certain seeds, roots, animals and other economic subsistence items. Several researchers have theorized that the pre-contact Toe and Kupa social organization and subsistence/settlement pattern was probably characterized by permanent villages, relatively specialized subsistence patterns (lacustrine oriented) and stable social groupings in contrast to the shifting settlements, unspecialized subsistence patterns and fluid social groupings known for post-contact times. In general, the system can be viewed as an adaptation providing survival under conditions of high risk.

Village population and size data are scanty for both groups although ethnohistorical and archaeological data suggest substantial populations in certain areas. There was no recognized formal leadership system although men of personal ability and initiative often organized a variety of temporary operating groups to conduct economic, ceremonial and recreational activities, often on a large scale and sometimes at the interband level.

The two groups share a number of Northern Paiute material culture traits with varying differences. Non-material traits, birth and childhood, puberty rites, marriage and death among others are similar to neighboring groups. Of some interest are their numerous myths one of which notes the Carson Sink area as the center of the Northern Paiute creation and the other which relates the story of the formation of Lone Rock on the present B-20 Air Warfare Range.

Warfare was extremely rare with the only major battle related in a myth,

An analysis of this story apparently indicates the dispossession of another group of Indians from the Humboldt Sink, the Saidukah, by the Kupadokada. Trade was carried out with the neighboring groups with buckskins and California shell beads being the main trade item.

At present, a moderate number of Native Americans belonging to the Paiute/Shoshone tribes are resident within the study area at Fallon and Lovelock.

An intuitive archaeological site records analysis indicated that a large number of aboriginal habitation sites are located in low elevation (less than 4100 feet), lacustrine settings, such as lakeshore, lake terrace, island or rise, and lakebed situations. Significant numbers of archaeological sites were found to be located in a variety of physiographic, ecologic, and elevational settings. The extant site record data base was found to be biased in favor of easily located and accessible caves, rockshelters and very large open sites and cannot be utilized to create a reliable predictive model of site location/distribution for the study area. Proposed statistical sampling inventories would serve both agency and professional interests. No recorded archaeological sites were located as being within the B-20 Air Warfare Range or its proposed boundary extension.

The research has indicated that no known historical or archaeological resource properties are present within the current boundaries or proposed extended boundaries of the B-20 Air Warfare Range. However, the archival data research indicates that "Lone Rock," the prime focal point for the Navy fliers practicing bombing and weapons runs, is featured in a local Northern Paiute myth concerning its formation and the surrounding area. As well, local informant data gathered through interviews with several long time residents and collectors indicate the presence of a significant, productive, collecting locality of archaeological materials on the present southern and western (southern $\frac{1}{2}$) boundaries of the B-20 Range. These two factors are discussed and a series of alternatives is presented offering a series of viable options to the Navy for their project development.

ACKNOWLEDGEMENTS

The cultural resource overview of the B-20 Air Warfare Range and surrounding region required the contributions and support of numerous people. To those who we have not mentioned below, please accept our apologies and thanks for your assistance.

First and foremost our thanks must go to Mr. David Powers, Powers and Associates and Mr. Chip Loveman, George Nolte and Associates, for their professional courtesies, comments and able administration of the contract. A special note of thanks is due as well to Mr. Brian Hatoff and Mr. John Roney, District Archaeologists, Carson and Winnemucca District Offices, Bureau of Land Management, for their many courtesies, general information and helpfulness during the project.

A note of appreciation is due to a number of professional colleagues who contributed advice and assistance to the project. Ms. Evelyn Seelinger, Ms. Amy Dansie and Mr. Donald R. Tuohy, Nevada State Museum Anthropology Department, are to be thanked for access to archival materials under their care and for general information and assistance in the study region. Dr. R.F. Heizer, Professor Emeritus, Department of Anthropology, University of California, Berkeley is remembered for his past comments, references and assistance in previous projects in the area that helped make this project possible.

Mr. J. Regan, Public Works Department, U.S. Naval Air Station, Fallon is thanked for his information on U.S. Navy history concerning the Fallon area. Mr. and Mrs. I. Kent, Mrs. D. Lawrence, Mr. G. Luke and Mr. V. Weishanpts deserve a special note of thanks for sharing their collections and information on the Carson Sink with us. Ms. Sharon Edaburn, Curator, Churchill County Museum, Fallon is thanked for her assistance on the historical portions of this report. Mr. Gerald Allen, Chairperson, Fallon Indian Reservation and Colony, is thanked for his information on the contemporary Native Americans of the study area.

Mr. Dan Roschz's cartographic representations add greatly to the report. Ms. Pamela Endzweig, Mr. John Liversidge and Mr. Scott Mende's research assistance contributed directly to the completion of the report. Ms. Betsy Llosa-Sandor is thanked for her typing of the final document.

INTRODUCTION

This report presents the results of a cultural resources literature/archive overview of the Bravo-20 Air Warfare Range and surrounding region as commissioned by the U.S. Navy (USN) for its Environmental Assessment pursuant to the re-withdrawal of the range from the Public Domain for reasons of public safety. The format utilized is similar to the regional data syntheses required by the Bureau of Land Management (Department of the Interior) for their Class I Cultural Resources Overviews.

The intent of this study is to provide the Facilities Engineering Command, USN with an overview and synthesis of the existing cultural resource information, including historic, prehistoric and ethnographic data available for the study area, in this case the Bravo-20 Air Warfare Range and the surrounding region. The Navy, in cooperation with the Bureau of Land Management (BLM), the agency responsible for the public domain land within the range boundaries, is mandated by the Antiquities Act of 1906, the Reservoir Salvage Act of 1960 (as amended by Public Law 93-291), the National Historic Preservation Act of 1966 (as amended), the National Environmental Policy Act of 1969 (NEPA), Executive Order 11593 and the Federal Land Policy and Management Act of 1976 (among others) to identify, evaluate and protect both prehistoric and historic cultural resources on public lands under its jurisdiction. The prime purpose of this overview is to provide a compilation and synthesis of data concerning any cultural resources present both on the B-20 Range and in the surrounding region that can serve as background information for the Environmental Assessment as well as contribute data for informed management decisions on the feasibility/suitability of the land withdrawal in view of the requirements of the Navy.

The data are presented in terms of previous archaeological research, a culture history (or sequence), ethnography, ethnohistory, a narrative history and needs and recommendations for future management and protection of any cultural resources within the boundaries of the Air Warfare Range. This compilation and presentation of cultural resource information will, hopefully, encourage long term planning resulting in the conservation and protection of a non-renewable portion of America's heritage.

As defined by the USN, the B-20 Range is located 31 miles northeast of the town of Fallon, Churchill County, Nevada, within the boundaries of the Carson Sink (Fig.2). The proposed withdrawal will affect 19,680 acres of BLM controlled land (public domain) and the purchase of 11,280 acres of Southern Pacific Land Company property now leased by the Navy. For the purposes of our overview, the B-20 Range is treated as a discrete locality within the boundaries of our defined study area, the Carson and Humboldt Sinks and vicinity. This arbitrarily defined area (cf. Roust and Grosscup 1957) covers several million acres of variable terrain in Churchill and Pershing Counties, Nevada. It is bounded on the east by the crest of the Stillwater Range and Antelope Valley; on the south by Four Mile Flat, the northern slopes of the White Throne, Desert and Dead Camel Mountains; on the west by the crests of the Hot Springs Mountains and the Trinity Range;

and on the north by the northern boundaries of the Upper Lovelock Valley and the West Humboldt Range.

Our report is divided into five general sections. The first section deals with the natural setting of the study region in broad detail while the second introduces the reader to a narrative/interpretive history concerned with both the study region and the surrounding area. Section three details the ethnography of the Native American peoples present at the time of white contact as well as providing background material on the contemporary Native American population. Section four deals with the prehistory of the region as reconstructed by archaeology and offers a broad overview of the culture history and chronological span of human occupance as well as brief notes on the extant archival site record data for Bravo-20. The last section offers a series of brief suggestions and recommendations for the USN in regards to direct cultural resource impacts on the proposed expansion of the Air Warfare Range. A series of specialized appendices conclude the data presentation and synthesis.

NATURAL SETTING

Introduction

The Carson and Humboldt Valleys are two of the more than 150 desert basins which, together with the more than 160 discontinuous subparallel mountain ranges that separate them, form the Great Basin section of the Basin and Range Province of the western United States. The Humboldt and Carson (Lahontan) Valleys are bounded by the West Humboldt and Stillwater Ranges on the east, the Trinity and Hot Springs Ranges on the north and west, and the Dead Camel, Desert, White Throne and Cocoon Ranges to the south. For the purposes of this report, the study area is bounded by an arbitrary line which follows the crest of the Trinity Range, drops down through the Upper (Lovelock) Valley and crosses the West Humboldt Range just south of Rochester Canyon. The line then crosses the Black Range by Troy Canyon and crosses Antelope Valley to follow the crest of the Stillwater Range. Continuing, the study area boundary crosses the Alkali Flat (between Eightmile and Fourmile Flats), Simpson Pass, and behind the White Throne Mountains at Russell Pass to follow the 4100' contour along the margin of the Dead Camel Mountains. The boundary then crosses the east side of the Carson Dam and Black Butte to follow the crest of the Hot Springs Mountains and Desert Peak before joining the Trinity Range (Figs. 1 and 2).

Geology

No Paleozoic formations are exposed within the study area although stratified rocks of Mesozoic age can be observed in the larger mountain ranges (Trinity, West Humboldt and Stillwater ranges). Johnson (1977:9) identifies 5 major stratigraphic groups of Early Triassic to Middle Jurassic age reflecting different depositional environments. Mesozoic intrusive rocks include Triassic leuco-granite, as exposed in the northern Stillwater Range; Jurassic granodiorite and gabbro, exposed in the West Humboldt Range just north of the Churchill/Pershing county line; and Cretaceous granodiorite and quartz-monzonite, exposed in the West Humboldt Range as well.

Tertiary deposits are represented by a series of lacustrine and fluvial sediments, shallow intrusive bodies and volcanics ranging in composition from basalt to rhyolite (cf. Willden and Speed 1974; Johnson 1977; Morrison 1964). In the valleys, interbedded alluvium, subaerial and lacustrine sediments, basalt flows and aeolian deposits of Quaternary age form thick accumulations of up to 625 feet (Morrison 1964). A report by the Humboldt River Basin Field Party notes the entrenchment of the Humboldt River in 50 to nearly 200 feet of these deposits, attributing this to the withdrawal of Lake Lahontan and a consequent lowering of the base level (USDA/NHRBSFP 1965).

Several episodes of orogenic activity are identified by Bonham (1965; cf. also Willden and Speed 1974). Paleozoic and late Mesozoic deformation is associated with compressional action, which produced "low-angle overthrusts and close, locally overturned folds (Bonham 1965)." The Cenozoic pattern is differentiated by the "extensive, high angle faulting and broad flexures" that control the present topographic appearance of the region (Bonham 1965:18).

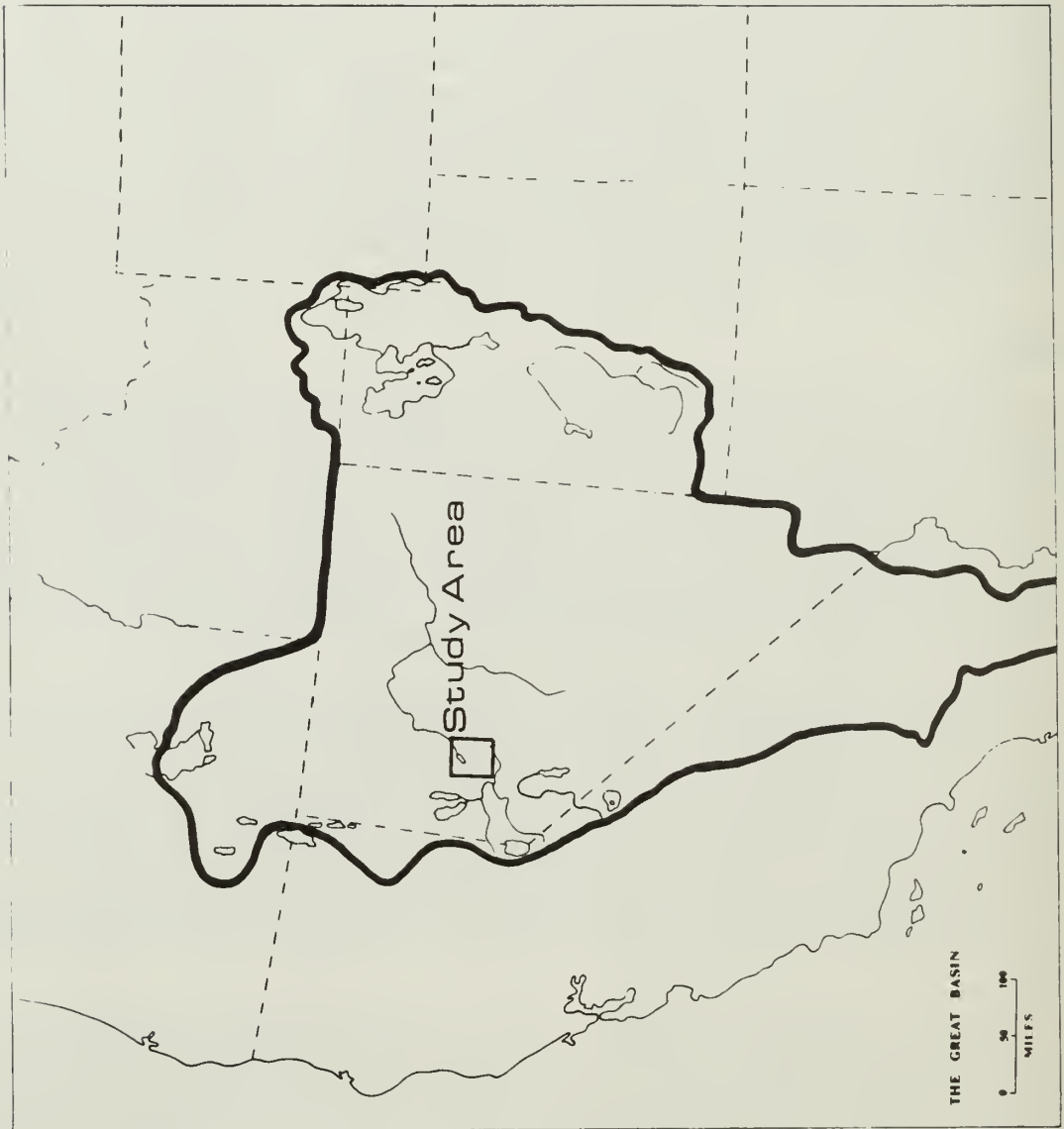


Figure 1: Location of Project Area.

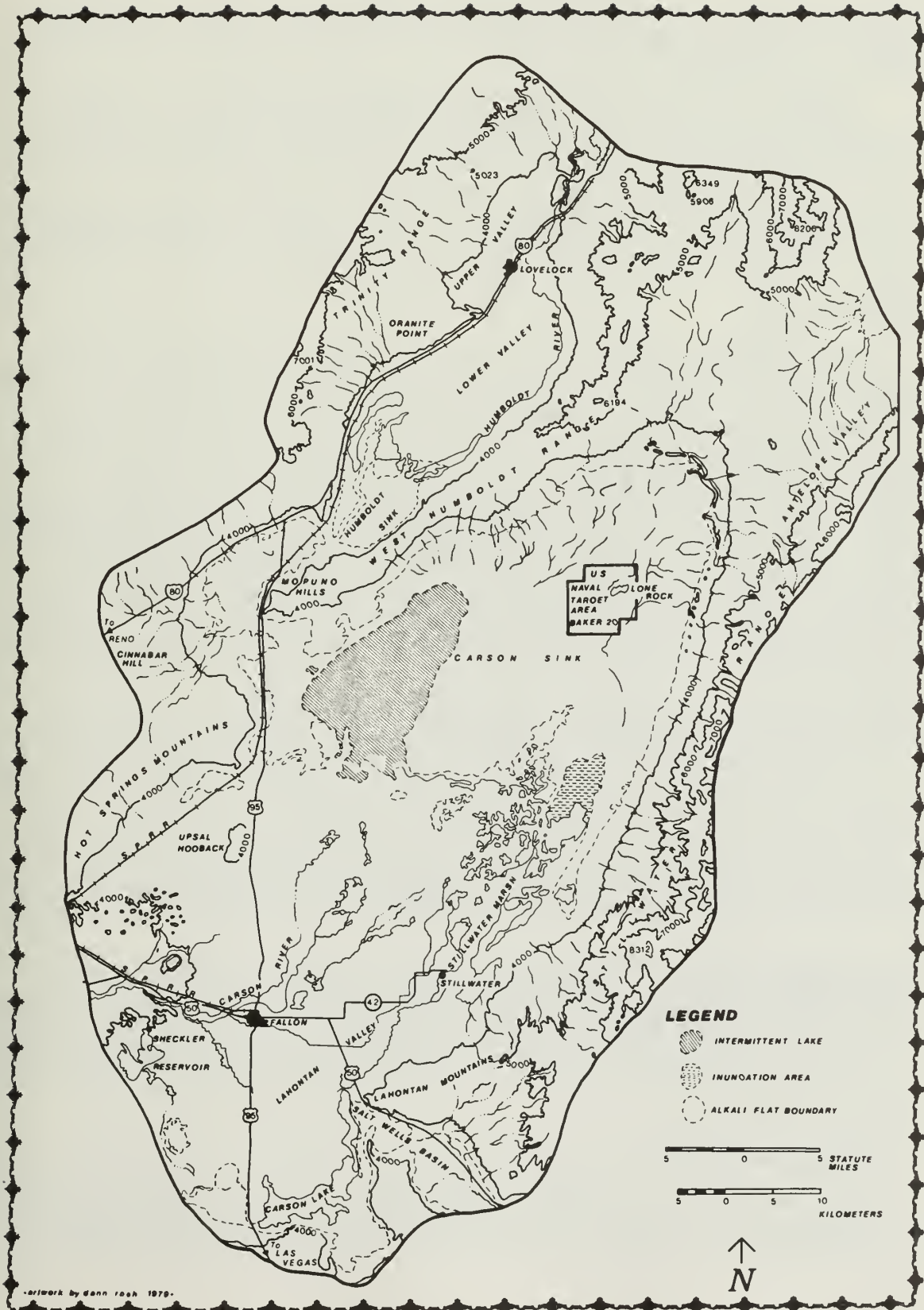


Figure 2

Holocene tectonic activity is exemplified by two major earthquakes which occurred in 1954 centered along the flanks of the southern Stillwater Range (Willden and Speed 1974:42).

Mineral resources of Churchill and Pershing counties include silver, gold, copper, lead, iron, tungsten, mercury, antimony, gypsum, perlite, diatomite, limestone, fluorspar, borax, soda, zeolite and gemstones (Johnson 1977; Willden and Speed 1974).

Detailed information on the geology of the study area can be found in Johnson 1977; Willden and Speed 1974 and Napton 1970).

Present Climate

Situated in the rainshadow of the Sierra Nevada, the study area is part of a "narrow arm of aridity extending up the eastern side of the Sierra Nevada from the more extensive arid regions of southern Nevada, southeastern California and western Arizona (Billings 1945:90)." Marked by cold winters, hot summers and low precipitation, the region is defined as a mid-latitude desert according to the Koeppen classification. While Fallon's annual temperature averages 50.7°F at 3965 feet, average temperatures of 29.8°F for January and 74.1°F for July indicate a considerable yearly range (Morrison 1964). The contrasts are emphasized by a mean diurnal amplitude of 33°F at Fallon, 31°F at Lovelock (4200 feet) and 26°F at Lahontan Dam (4100 feet) (Houghton, Sakamoto and Gifford 1975:28). Minimum and maximum temperatures recorded at Fallon over a 49 year period indicate a range of 131°F: from -25 to +106°F (cf. Morrison 1964) although average winter temperatures rarely drop below -5°F.

Seventy-five percent of the precipitation in the area is released from Pacific storms between December and May, although amounts vary widely from year to year. Mean annual precipitation for the period 1897-1952 amounts to a mere 4.95 inches at Fallon and 4.35 inches at Lahontan Dam, with extremes ranging from 1.0 to 9.0 inches (USDA/NHRBSFP 1965:20). The tropical thunderstorms responsible for the precipitation maxima in southeastern Nevada do not affect the study area. Snow is infrequent at the lower elevations although Morrison (1964) notes that the crest of the Stillwater Range is snow-covered during most of the winter months.

Frosts generally occur from early fall into late spring. The length of the growing season is estimated at 130 days (at 32°F) and 160 days (at 28°F) (USDA/NHRBSFP 1965:20). A feature of the area is the "Pogonip," (derived from a Paiute word meaning "white death") a winter fog, which at sub-freezing temperatures can cause a layer of rime or frost feather to form (up to 0.5 inches thick) on trees and other objects (Houghton, Sakamoto and Gifford 1975:61).

Vegetation (Fig. 3)

The vegetation of the Carson Sink area has been treated in some detail by Billings (1945). The following summary is based primarily on this study with supplementary information from Cronquist, et al (1972) and Shantz (1925).

Combining elements of both Northern Desert and Salt Desert Shrub (cf. Shantz 1925), the study area's plant cover is dominated by various associations of drought-tolerant desert shrubs, with a sparse seasonal undercover of annuals and perennials. The various communities are strongly controlled by soil salinity and drainage. Most widespread is the Little Greasewood-Shadscale Association (Billings 1945) of low, evenly spaced, microphyll shrubs which cover between 5% and 12% of the ground surface. This community is composed primarily of little greasewood (Sarcobatus Baileyi - 50%) and shadscale (Atriplex confertifolia - 28%), and to a lesser degree of budsage (Artemisia spinescens), winterfat (Erotia lanata) and wolfberry (Lyscium Cooperii). This association is considered by Billings to represent the climatic climax of the region and occupies the well-drained sediments of pluvial Lake Lahontan and the residual soils of the lower volcanic mountain ranges.

In areas of greater moisture, generally at the higher elevations above the former lake shore where precipitation totals more than 7.0 inches a year, the Little Greasewood-Shadscale Association is replaced by the Sagebrush Association. This association is ". . . typical of the semi-arid stepped country surrounding the Carson Desert on the west and north and on the higher mountains to the east (Billings 1945:106)." It is characterized by big sagebrush (Artemisia tridentata), horse-brush (Tetradymia glabrata), Mormon tea (Ephedra viridis), spiny hopsage (Grayia spinosa) and two species of rabbitbrush (Chrysothamnus puberulus; C. nauseosus). A number of bunchgrasses and forbs are associated with this community. Sagebrush also occurs at lower altitudes among the Cottonwood Association, a riparian community that is dominated by Fremont cottonwood (Populus Fremontii) and willows (Salix spp.). This association forms gallery forests along the lower Truckee, Carson and Walker Rivers. Pure stands of winterfat are found in the northern areas of the Carson Desert. Shantz (1925) sees this winter range plant as successional to his Shadscale Association, occurring where the latter has been killed off. Another genus found primarily in disturbed areas is rabbitbrush which frequently invades where sagebrush has been killed by drought (cf. Shantz 1925:16)

The extensive playas of the Carson Desert are fringed by several halophytic communities which vary from each other primarily in their water requirements and salt-tolerance. Together with various species of shadscale, big greasewood (Sarcobatus vermiculatus) grows on saline clayey soils with a permanently wet substrate due to the proximity of the water table.

Other halophytes found in the study area include iodine-bush (Allenrolfea occidentalis) and western samphire (Salicornia rubra). Saltgrass (Distichlis stricta), bullrush or tule (Scirpus spp.), cattail (Typha spp.) and spikerush (Eleocharis macrostachya) favor shallow water and are found in the marshy areas of the study area - Humboldt Lake area, Stillwater Wildlife Refuge, Carson Lake, among other localities.

The stabilized dune areas are colonized by an association of non-spiny, small-leaved shrubs of medium height dominated by the Nevada dalea (Psoralea polyadenia). Juniper (Juniperus osteosperma) is found at the higher elevations of the sagebrush belt (Cronquist, et al. 1972:90) while Napton (1970), among other sources, notes the presence of pinyon pine (Pinus monophylla) in the Stillwater Range.

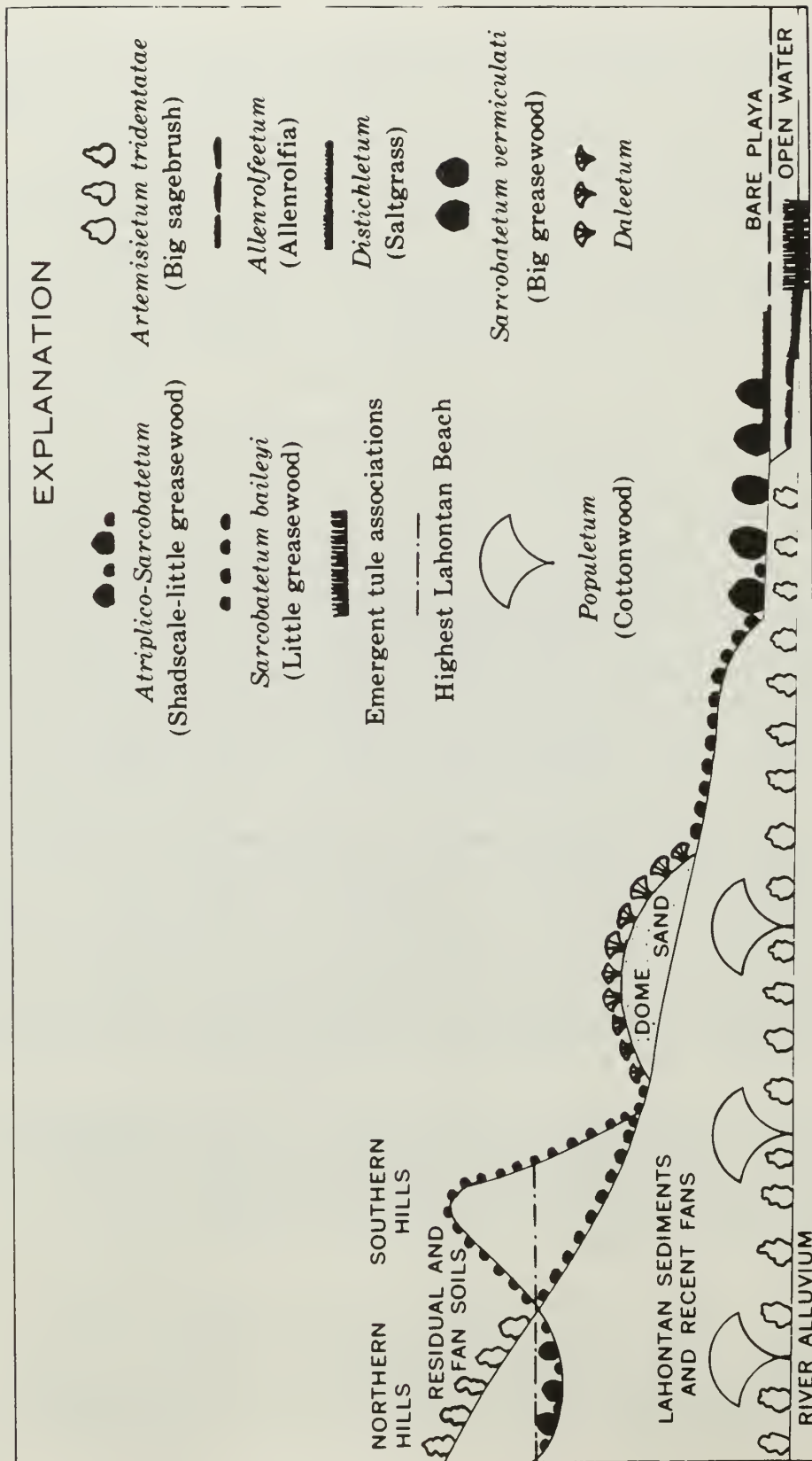


FIGURE 2.—Diagram of the topographic and geologic positions of the principal plant associations in the Carson Desert region.
From Billings (1945, fig. 4).

(From Morrison 1964)

Figure 3

Wildlife

With regard to its mammalian fauna, the study area can generally be classified as Upper Sonoran according to Merriam's Life Zone concept (1898). Hall (1946) lists 83 species for this zone which covers nearly 90% of Nevada. Some variation at the subspecific level is attributed to the former presence of pluvial Lake Lahontan. Microenvironmental conditions created by its recession may have been responsible for the invasion of the study area by species otherwise typical of the more southern Lower Sonoran species (cf. Hall 1946:61).

Hall (1946) should be consulted for detailed information on the mammals of the area. The avifauna is discussed in Alcorn (1945) and Linsdale (1936). The reader is referred to Van Denburgh (1922) and Stebbins (1966) for data on the reptiles common to the area. Fish resources are covered in Hubbs and Miller (1948) and La Rivers (1962).

Holocene Climatic Change

Cultural ecology (Steward 1938), or the relationship between human beings and their natural environment, has for several decades been of special interest to students of Great Basin anthropology. It is in such sensitive geographic areas of climatic extremes that a seemingly minor fluctuation in precipitation and/or temperature may severely affect the availability of local food resources, making a population's adaptability the key to its survival.

One of the major controversies in Great Basin prehistory has centered on the tri-partite model of Holocene climatic change proposed by Antevs (1948, 1952, 1953, 1955). Based on geological and botanical data from North America as well as Europe, Antevs postulated two Wisconsin pluvial periods for the Great Basin, which he attributes to a southward displacement of the storm-track as a result of the corresponding continental glacial expansions (Iowan and Mankato) of higher latitudes. These periods of high rainfall and probable temperature rise, termed the Lake Lahontan and Dendritic Lake pluvials in the study area, are suggested to have undernourished the ice sheets, leading to maxima of Sierra Nevadan alpine glaciers (Tahoe and Tioga) and high levels of the internally draining pluvial lake systems.

Antevs (1948) suggested a date of 9000 B.P. for the end of the Wisconsin glacial and the beginning of the so-called Neothermal, which he subdivided into three general temperature ages (Fig. 4).

As the former sump for nearly 60% of Lake Lahontan's total drainage area (Morrison 1964:2), the Carson Desert provides a wealth of paleoclimatic information in its stratigraphy, pedology, terraces, and other shore features. As early as 1885, I. Russell, based on his studies of the geology and geomorphology of the entire Lake Lahontan basin, inferred two deep-lake periods separated by a long interval of probably complete dessication (summarized in Morrison 1964:4), and followed by a period of post-Lahontan drought.

Figure 4

Subdivisions of Postglacial Time
(Antevs 1948, 1952, 1955)

<u>Time</u>	<u>Temperature Age</u>	<u>Moisture Conditions</u>
Present	Medithermal	Moderately warm; arid and semi-arid. Rebirth of Great Basin Lakes.
2500 B.C.	Altithermal	Arid; disappearance of Great Basin Lakes. Distinctly warmer than present.
5000 B.C.	Anathermal	Climate at first like today but growing warmer. Probably subhumid and humid. Great Basin Lakes higher than in Medithermal.
7000 B.C.		

In general, his results have been confirmed and supplemented by subsequent research, among which Morrison's comprehensive study of the geology of the southern Carson Desert (1964) figures most prominently (cf. also Antevs 1945, 1948, 1952, 1953, 1955).

With regard to Holocene climatic change, Morrison's results support the concept of an arid Altithermal, as evidenced by the Turupah Formation, an accumulation of up to 30 feet of aeolian sand and local alluvium, conformably overlain by the Toyeh, a submature Grey Desert Soil of up to 1.5 feet thickness. The Toyeh, according to Morrison (1961:D113) "attests to somewhat increased precipitation, plant cover, and cessation of wind erosion during the later part of this warm interval." The subsequent Fallon Formation, reflecting five shallow-lake cycles, comprises up to 36 feet of "subaerial sediments of Recent Age" (Morrison 1961:D113), corresponding to Antevs' Medithermal. Underlying the Turupah Formation, the gradual drying of the Anathermal is represented by the two most shallow lake cycles of the Sehoo Formation, the six members of which, as a whole, correspond to Morrison's second deep-lake period.

In line with Antevs' proposition, Morrison correlates high lake stands with glacial maxima of the Sierra Nevada; thus, the Eetza Formation of the first deep-lake period corresponds to the Tahoe, the Seho Formation to deposits of Tioga age, and the Fallon Formation to Matthes' Little Ice Age in the Sierra Nevada (Morrison 1964).

Absolute dates for fluctuations in the level of pluvial Lake Lahontan are provided by radiocarbon analyses of samples of lithoid tufa, co-existing aragonite gastropods and calcite-cemented sand from the Walker and Pyramid Lake basins to the south and west of Carson Sink, respectively (Benson 1978). The results reveal a dramatic shift from an extremely high stand (1330 meters above sea-level, or 22 meters above the highest internal sill depth above which the 20 separate basins of Lake Lahontan overflow to contain one continuous body of water), between 13,500 and 11,000 years B.P. to an extremely low level beginning at approximately 9,000 years B.P. Benson's calculations indicate a total decrease in volume from 2,130 to 55 km³ and in surface area from 22,300 to 11 km² in less than two thousand years. Benson infers a period of warm and arid conditions lasting from 9,000 -5,000 years B.P. during which all Lahontan lakes excepting Pyramid dried up. The last 5,000 years are seen to have witnessed an increase in size of both Pyramid and Walker Lakes until the introduction of large-scale irrigation in the early 1900's.

A promising pilot study, undertaken in the early 1960's, attempted to test tufa samples from the northern Humboldt Sink and Pyramid and Winnemucca Lakes for pollen, climatically sensitive trace elements and thermoluminescence (Shutler 1961). This, the researchers hoped, would "compliment stratigraphy and radiocarbon dating in correlating Lake Lahontan beach terraces with the climatic fluctuations responsible for their formation" (Shutler 1961:513). Unfortunately, to our knowledge, no further information has been published on this research.

The association of natural and cultural stratigraphy in several archaeological cave sites of the study area has produced additional information on the environment of early Great Basin populations. Ranere (1970) presents stratigraphic evidence from Leonard Rockshelter, situated near the north-eastern edge of the Humboldt Basin (cf. Heizer 1951a), and Hidden Cave, northeast of Carson Lake, which indicates a succession of climatic regimes corresponding with Antevs' model (cf. Morrison 1964; Roust and Grosscup 1957). More recent palynological investigations at Leonard Rockshelter have produced evidence of a prominent Pine/Cheno-Am/Pine oscillation, with pine at a minimum between ca. 6000 and 4000 B.P. While several complicating factors in the interpretation of the pollen record are recognized, the data apparently represent a reflection of regional changes in climate or changing lake levels due to regional climatic change within the Humboldt Basin (Byrne, Busby and Heizer, in press).

Evidence from the Sierra Nevada suggests that neoglacial climatic variation "...can be explained by a climatic model in which the extremes of mean precipitation for the 96 years of historical record are greater than the range of long-term means for that climatic parameter (Curry 1969:1)."

While some disagreement still exists with regard to the chronological boundaries of the Antevs' scheme, this should be of lesser concern, since, as Bryan and Gruhn (1964) have pointed out, dates may vary from one locality to another and should therefore be determined independently for each region. In reference to the study area, it is apparent that the data suggest post-glacial climatic change of some magnitude, but its effect on man-land relationships has yet to be determined with reliability (cf. Morrison 1964; Byrne, et al., in press; Baumhoff and Heizer 1965; Weide 1976; Weide and Weide 1977; Mehringer 1977). Future research, presently being conducted at Hidden Cave (D. Thomas, personal communication, 1979) may add to our data on climatic change and its cultural effects within the study area.

An excellent review and synthesis by Mehringer (1977) is recommended for reference to related paleoenvironmental studies throughout the Great Basin. It is hoped that future research will be directed at explaining the climatic changes and phases noted so far in the paleoenvironmental record.

Chapter 1

Routes to the Pacific, 1829-1903.

As Anglo-Americans focused their vision on the Far West during the 1820s, they had reasonable conceptions of the terrain of the Rocky Mountains and the lands along the Pacific coast. However, they had little knowledge of what lay in between those two frontiers of white civilization. On the eve of American expansion from coast to coast, the Great Basin remained a mystery to whites who speculated on its features. Some came to believe the legend that a large river flowed through the region to the Pacific Ocean, while others were convinced that between the Rockies and the Sierra Nevada lay the Great American Desert. Finally tempted by the motives of economic gain, territorial expansion, and national pride, Anglo-Americans began to make their way into the Great Basin. For a time the first expeditions only served to add to the prevailing confusion over the uncharted region, but white explorers finally began to piece together their knowledge of the area into a useful understanding of the Great Basin. This information laid the groundwork for succeeding groups of Americans who entered the vicinity of the Great Basin and specifically crossed through central Nevada. The overland emigrants, the overland stage and mail lines, and the transcontinental railroad all followed the lead of early explorers in carving their routes to the Pacific by way of the Humboldt River and the Carson Sink. Moreover, though few passing whites even considered settling in the vicinity, each stage of westward expansion through central Nevada contributed to the dispossession of the Native Americans there.

I. Early Exploration, 1828-1845

The imperative of the Anglo-American fur trade to locate new sources of beaver in western North America compelled the first whites to enter into the study area. Peter Skene Ogden, an Englishman in the employ of the Hudson's Bay Company, became the first white man to follow the Humboldt River and cross the Carson Sink. In fall, 1828, Ogden learned of the possibilities of the lower Humboldt region from Indians while trapping on the upper stretches of the river. By spring, 1829, Ogden and his party had followed the stream past the present site of Lovelock to its mouth on Humboldt Lake. They made camp on the eastern shore of the sink, where they were soon encircled by seemingly hostile Indians armed with rifles. After determining that peace would be maintained, Ogden communicated with the Native Americans, who told him of the geography beyond the lake and toward the Sierra Nevada. Although Ogden was anxious to explore that new territory, he had to return to his headquarters at Fort Vancouver on the Columbia River (Cline 1963:8,103, 117, 123). (It should be noted here that discussion of contact between whites and Indians in the area is reserved for Section V. of this chapter.

Ogden returned to Humboldt Lake during the autumn of 1829 on his last Snake Country Expedition. As he was unable to get assistance from the more reticent Indians this time, he had to find his own way across the western reaches of the Great Basin. Conscious of the need for a reliable

supply of water in the arid climate, Ogden led his party along the most natural and best watered path away from the Humboldt River. He followed the Humboldt Slough across the natural dam and into the Sink of the Carson River. After skirting the western edge of the desert, Ogden's party moved southward to Walker Lake, and then continued on through Owens Valley in the present state of California. This journey made Ogden "the first Caucasian to visit this area between the Humboldt and the Walker Rivers." Upon his return to Fort Vancouver in 1830, however, Ogden chose a different route (Cline 1963:7-8, 125-126; Hattori 1979:7).

Three years after Ogden's trip through central Nevada, another mountain man and fur trapper, the American Joseph Reddeford Walker, became the second white to travel through the study area. Even more than Ogden, Walker epitomized the combination of entrepreneurial fur trapper and nationalistic explorer. Although like Ogden he hoped to find untapped resources of fur to replace the diminishing supply in the Rocky Mountains, Walker was perhaps even more motivated by a sense of Manifest Destiny. He and his men believed that by stretching their dominion from one ocean shore to the other, Americans would realize their national destiny. Walker and his compatriots righteously anticipated the day when virtuous American yeomen would supplant the seemingly haphazard economies and unvirtuous lifestyles of Mexicans and Indians in the Far West. In its journey across central Nevada, the Walker expedition expressed its sense of purpose and its contempt for other ways of life in two ways. First, the very presence of the party in the Great Basin and California flouted Mexican claims and government in the areas. Although the Mexican claim to the Great Basin was ambiguous and unsupported by any force, the Americans clearly trespassed onto Mexican territory in California. Second, the attitudes toward and methods for dealing with the Native Americans initiated a lingering disregard for Indian cultures while reaffirming Americans' sense of moral and cultural superiority. One member of Walker's party, Zenas Leonard, kept a journal of his travels which expresses these attitudes clearly (see Quaife 1978).

Operating under the remote command of Captain Benjamin Louis Eulalie de Bonneville, Walker led an expedition down the Humboldt River in fall, 1833. Like Ogden, Walker and his men encountered Indians at the sink of the Humboldt, but this time fighting broke out, resulting in the first battle between Indians and whites in the Great Basin. The brief skirmish, in early October, left between 25 and 35 Indians dead. Convinced that they had quelled the threat of Indian hostility, though in fact they had merely enhanced it, Walker and his party hastened on toward California. They probably followed Ogden's approximate path into the Carson Sink and toward the Walker River. Instead of circumventing the Sierra as Ogden had done, however, Walker led his men over the mountains on the first successful white crossing of the range from east to west. After wintering in coastal California, the party returned to Nevada by way of Owens Valley in 1834. After getting lost between the Owens Valley and Walker Lake, the group regained its old trail and retraced its steps along the western edge of the Carson Sink to Humboldt Lake. Once more, Walker's men clashed with the Paiute at Humboldt Lake, leaving 14 Indians dead and again escaping without serious white casualties. The party returned to the fur trappers'

rendezvous in the Rockies by way of the Humboldt River. As a result of this well-publicized trip, the Humboldt route was put onto the map for overland travelers (Cline 1963:172-179; Simpson 1876:18-19).

Joseph Walker also helped to guide the last major exploring expedition through the Humboldt Sink and Forty-Mile Desert region before mid-century. In 1844 and 1845 a party of eminent pathfinders led by John C. Fremont traversed the study area. Although they found nothing that previous parties had not already discovered, this expedition contributed to a growing body of white reactions to the western Great Basin. For example, these pioneers were still confused about the nature of the topography of central Nevada. Although Ogden had determined that the Humboldt River emptied into an alkaline sink, some whites continued to deny it. They suspected that the Humboldt, or some other stream in the basin, drained into the Pacific Ocean. Fremont himself, renowned for his pioneering abilities despite numerous questionable decisions, believed that the Truckee and the Carson Rivers belonged to one system. His confusion was compounded when he encountered the Carson and the Humboldt running together in a wet year and could not decide in which direction the river "system" flowed (Fulton 1909:82; Smith 1911:125).

Fremont reached this juncture of the Carson and the Humboldt in January 1844 with Kit Carson. The expedition then blundered into the Sierra in an unsuccessful attempt at a winter crossing near the present site of Bridgeport, California. Later that year Fremont led another expedition into central Nevada from the east. This time Fremont led half of his party over the Sierra near Truckee and into the central valley of California. The other half of the expedition, under the leadership of Theodore Talbot, Joseph Walker, and Edward Kern, headed down the lower Humboldt River, crossed the Forty-Mile Desert, and hurried through Owens Valley to rendezvous with Fremont's command in late 1844. Walker led this party over the same route he had used in 1833 and 1834, so no new territory was covered. However, for the first time one of the major explorers, Edward Kern, left some detailed descriptions of the Humboldt River and sink, the Forty-Mile Desert, and Carson Lake and sink (Kern 1876:478-479).

At the end of this expedition, John C. Fremont was to give the Humboldt its present name, but Kern continued to refer to the river and lake as "Ogden's" or "Mary's" river and lake. Along the middle portions of the Humboldt, Kern had found ample grass and timber. Toward the lake, however, the lands became "more desolate" and the soil "more sandy and fertile." He anticipated that lands near the river bottoms might be cultivated, but the surrounding areas seemed to offer little more than an abundant supply of ducks and geese. After the party followed the river to its sink, it crossed the Humboldt Dike, "a low gravelly ridge, mixed with heavy sand." Once on the other side of the natural dam, Kern sounded even more pessimistic about the lands on the western edge of the Carson Sink (Kern 1876:478-479):

Nothing can appear worse than the surrounding country; the glare of the white sand [White Plains?], relieved only by the rugged distant mountains, the absence of animal and vegetable life, make up a whole in the way of dreariness and desolation.

Kern held the Carson Sink itself, however, in higher regard: "the outlet of Ogden's lake...forms a large marsh in the midst of the sand hills." Standing out as a "pretty sheet of water," with abundant water fowl, it seemed less unpleasant than the surrounding desert. Kern's hopes were dashed at Carson Lake, however, with its "indifferently good" water: "About eight miles below us this stream [the Carson Slough] forms a large marsh, hidden from us by sand-hills. Walker tells me that its waters are extremely disagreeable" (Kern 1876:478-479). In comments like this, Kern foreshadowed the unfavorable attitudes of later travelers through the region of the Humboldt Sink and the Carson Desert.

II. The Overland Emigrant Trail, 1841-1868

Even before Kern, Walker, and Talbot made the last explorers' journey through the region of the Humboldt and Carson Sinks, emigrant parties began to use the route on their way to California. At first the emigrants amounted to little more than a trickle, but with the American conquest of California and the discovery of gold there in the late 1840s, the numbers of travelers on the trail soared. As with the earliest white explorers, the Humboldt River served as the "lifeline" for these emigrant parties (Cline 1963:112). The Bidwell-Bartleson expedition from Missouri became the first group of emigrants to use the route through central Nevada on its way to California in the late summer of 1841. Like Ogden and Walker, the party followed the Humboldt to its sink, turned south across the Natural Dam following the Humboldt Slough, and skirted the Carson Sink on its way to the Carson River, which they followed toward the Sierra. One member of this first group, Joseph Chiles, returned to Missouri the following year, and by 1843 was ready to lead another party to California. On the way the group acquired Joseph Walker as its guide, and Walker led them along the same path as before, except this time they entered California via Owens Valley, which promised an easier crossing of the Sierra range. In 1844 the third emigrant group, the Stevens-Murphy party, appeared on the scene. This time, however, instead of turning south at the Humboldt Sink, the group made its way westward toward the Truckee River, and followed that stream into the Sierra. Whereas other parties of emigrants and explorers had generally used the Carson River route, the Stevens-Murphy expedition established the alternative of the Truckee River route, and created a fork in the trail at the Humboldt Sink (Cline 1963:184-185, 187-188; Nevada Emigrant Trail Marking Committee (hereafter NETMC) 1975:entire).

Both routes were used but sparingly until the gold rush to California of 1849. After that point Americans used the overland trail steadily until the coming of the transcontinental railroad in 1869. From 1847 until 1860, the lands through which the trail passed were claimed by the Mormons as part of their Kingdom of Deseret, while the federal government designated

virtually all of the Great Basin as the Territory of Utah. The Mormons, like the Mexicans, had done little to back up their claims to the territory, and did not interfere with overland migrants for the most part; in fact, the Mormon economy and Salt Lake City benefited enormously from the business brought by Gentile migrants into the Great Basin.

Although the entire length of the route from the lower Humboldt past the Forty-Mile Desert contained hardships, the least unpleasant portion of the trail through the study area lay along the Humboldt River. Emigrants, of course, did not always appreciate the relative comforts of the river valley through which they traveled. One Forty-Niners' song, in fact, decried the strangeness and unpleasantness of the Humboldt River (Morgan 1943:189):

I crawled out and started on, and managed very well
Until I struck the Humboldt, which I thought was nearly Hell.
I traveled till I struck the Sink, where outlet can't be found;
The Lord got through late Saturday night,
He'd finished all around,
But would not work on Sunday, so He ran it in the ground.

Moreover, emigrants like Mark Twain complained of the unpalatable water at the sink, the consumption of which was "like drinking lye, and not weak lye, either" (Morgan 1943:7-8). However, these criticisms were comparatively soft beside the stronger dislike for the Forty-Mile Desert. In the Humboldt River valley, the emigrants at least enjoyed a steady supply of mostly usable water and were able to make use of the vegetation that grew along the river banks for their animals. Within the study area, this portion of the trail passed near the old Salinas Ranch in Pershing County and moved into the Lovelock Valley, which was called Big Meadows. To the emigrants, the valley and its wild hay seemed like a "desert oasis." Past the present site of Lovelock, at the head of Humboldt Lake, the trail forked so that travelers could go down both sides of the sink. At the end of the lake, the trails reunited briefly near Miriam. This was the final stop with potable water before the Forty-Mile Desert. The trail soon forked again, one branch following the Carson River route, the other heading toward the Truckee (NETMC 1975:5-8, 32-34).

From the sink of the Humboldt, the distance to both the Truckee River and the Carson River was 40 miles, and the harsh stretch of trail between the two bodies of water came to be known as the dreaded Forty-Mile Desert. The rough and sandy terrain slowed the emigrant parties down, while the lack of potable water spurred them on. The frustrations and desperation along this stretch of the Overland Trail forced many travelers to abandon their baggage, wagons, and stock in the desert, and some of the travelers themselves perished there. At Ragtown, the site which marked the end of the desert along the Carson River route, a cemetery of more than 200 migrants had developed by 1861, sheltering the victims of both disease and exposure to the unrelenting climate. Even earlier, by the end of 1850, an estimated 9000 dead animals and 3000 wagons had been left along the same fork of the trail. Despite the efforts of twentieth century collectors, numerous

sites along the old trail can be found today where remnants of animals and wagons still lie (de Braga 1964:10; Wheeler 1971:52; Voorhis n.d.:1; Roney, et al. 1977).

The Carson River route was generally the more popular path to the Pacific among overland travelers. It was both more level and, owing to the publicity of Walker's travels, more established than the alternative to the north. Emigrants who took the Carson route generally followed the footsteps of both Walker and Ogden in the study area. They passed through the natural dike of the Humboldt, followed the slough into the Carson Sink, and then turned southwest past Soda Lake toward Ragtown and the Carson River. Two veterans of the journey describe this route for future travelers in their Travelers' Guide Across the Plains Upon the Overland Route to California in 1852 (Morgan 1963:26-27):

[From] THE SOUTH END OF THE SINK:

12 m No grass or good water for 39-1/2 miles. Here you prepare for the desert and pass over a small ridge [the Humboldt Dike], to a valley where a part of the water of Mary's [Humboldt] river, having escaped from the lake, sinks. On entering the valley you bear to the right, leaving the valley [the Carson Sink?] to your left. You, however, soon turn to the left, and crossing the valley, pass between two bluffs. Road good for a desert.

TO THE SALT SPRINGS

15- A little of this water will do your animals no harm. The
1/2m road is good, except a little sandy.

TO THE SAND RIDGE

12 m You now travel through deep sand

TO THE CARSON RIVER.

This particular guide glossed over some of the problems of the desert crossing. Emigrants generally had to gather both grass and water to carry them through the desert. The water generally came from the last potable portion of the Humboldt, while the hay often came from the Big Meadows, or what is currently known as Lovelock Valley. In wet years when the Humboldt Slough was running, the travelers often had to take stones with them in order to form a road bed in the slough for their wagons to cross. These stones remain in place even today (NETMC 1975:20,20a,39; Welliver 1967:18-21). Many emigrants had to turn back, resupply themselves, and start again. Some also tried, and failed, to find water along the way by digging relatively deep wells. When they could, the emigrants tried to make as much of the journey as they could at night, and were loathe to stop in the desert once they had started. Yet, despite all precautions, few were able

to avoid the hardships and suffering along this stretch of the westward journey (Wheeler 1971:32-53; Payne 1895:73-98; NETMC 1975:2-3,19,19a,20,20a,39,45).

Horace Greeley, one of the most illustrious travelers to use the emigrant trail, left his impressions of the Carson River route after taking the trip in 1859. Greeley, a famous editor and one-time candidate for President of the United States, encountered the Forty-Mile Desert after years of accumulated experience had mitigated some of the earlier dangers of the crossing, yet he still found that leg of the overland train most unpleasant. Greeley had despised the stretch along the Humboldt River, which he found dull, but he became even more venomous in describing the Carson route across the western edge of the Carson Sink. Traveling in a stage coach, Greeley's party began its crossing at nightfall and made good progress until the wagon became stuck in one of the "backsets" of the Humboldt Slough. This delayed what was already an uncomfortable journey. After midnight Greeley's group reached the halfway point at some salt springs, where only "brackish" water could be had. After that Greeley's misery was heightened by the heavy sand that slowed his wagon to a crawl. The famous editor thoroughly detested the desert crossing. Nine years later he summarized his contempt for the journey in his memoirs by labeling the region "a waste of sand" (Duncan 1964:231-232; Greeley 1868:378).

The Truckee alternative provoked similar responses from overland emigrants, and for two reasons was less popular than the Carson route. First, its terrain was more rugged, much to the displeasure of travelers with their ox-drawn wagons. Second, the Truckee's popularity suffered from its connection with the disaster of the Donner party in 1846. Later emigrants who heard of that ill-fated expedition sought to avoid the same fate in the High Sierra by taking the southern route. As a result, fewer travelers chose to cross the northern portion of the Forty-Mile Desert.

The Truckee River route approximately follows the course of the present day highway Interstate 80 through the study area. It featured rocky foothills and even more deep sand than along the Carson River route, and was no shorter. In 1849 the Emigrants' Guide to California described the path to the Truckee River. After crossing the Humboldt Di~~k~~e, one encountered a "low marsh" characterized by "a most disagreeable effluvia" to the west of Humboldt Lake. The emigrants then traversed the barren playa of White Plains and climbed a pass to a rugged plate~~a~~ua. Travelers found both "high undulations" and "dry ashy earth" along this portion of the route, the sand "so soft as to admit the feet of cattle ten or fifteen inches deep at times." To the west of White Plains and upon the plateau, emigrants encountered Brady Hot Springs, which one traveler described as

the most dreary desolate looking place we ever saw. It is on the top of a mountain and the water bubbles and boils up from the fissures in the rocks and forms into a small lake quite clear but so hot that it scalds.

When cooled, however, the water could be used by man and beast. This fresh-water spring was the only relief for emigrants upon the Truckee route, and was that path's lone advantage over the Carson River route (Caughey 1932:34-36; Wheeler 1971:30; Clark 1928:39; NETMC 1975:9-10,34-35).

Enterprising business men were quick to realize the solid market along the emigrant trail. Throughout the 1850s, emigrants were more than likely to encounter a string of hastily constructed "trading posts" along the Humboldt and the Carson routes, where water, whiskey, and other goods could be purchased at exorbitant prices. The vulnerability of the emigrants enabled these merchants, and others as well, to prey on the overland travelers at will. Ragtown, the first settlement in Churchill County, revolved around the business that emigrants brought. In 1854, Asa L. and Catherine Kenyon established a trading post there, and proceeded to fleece the passing emigrants in both reputable and disreputable ways. By the late 1850s, Ragtown had become a seasonal hive for traders, gamblers, and thieves (Wheeler 1971:52; Townley 1977:3; Paher 1970:89). Elsewhere on the trail in 1855, two French travelers, Jules Remy and Julius Brenchley, had to ward off two ruffians who seemed intent on stealing their goods. The ruffians lived near the Humboldt Dike "in a plank hut on which an American flag was flying." The flag merely served as an attempt to distract unsuspecting travelers from the attempts of the two. Remy called them "fugitives from society for the purpose of plundering the pilgrims of the desert with impunity" (Remy 1861 I:60,70-71). The barren setting and the great distance from civilized authorities certainly contributed to these dangers presented along the overland emigrant trail.

The prospects for these sorts of "entrepreneurs" remained bright through most of the 1860s as use of the trail remained steady. Through the late 1840s and the 1850s, most traffic on the overland trail was westbound. When mining prospects in California seemed to dim in the late 1850s, east-bound travelers began to use the route in their search for better mining opportunities in the Great Basin. In particular, the Carson River route came to serve as a road from the western Sierra to strikes in central and eastern Nevada, including those in the Humboldt Range and the Reese River country. By 1862 the steady two-way travel sustained both a way station at the cut in the Humboldt Dike and a ferry across the Humboldt Slough on the western edge of Carson Sink. Whereas the ferry must have been seasonal in operation, the station at Humboldt Dike seemed to be more permanent. Horace Greeley recalled an unofficial post office in 1859 at the foot of the lake, "a cottage built of stones and clay" that "constituted the mail-station" (Anonymous 1862; Greeley 1868:378). Like the tiny stop at Ragtown, the center of activity at the cut in the natural dike of the Humboldt was another small settlement in the early history of the study area.

III. The Central Route, the Pony Express, and the Overland Mail, 1859-1869

Although emigrants continued to use the path down the Humboldt River and across the Forty-Mile Desert, the Overland Route did not satisfy the ever-increasing business interests in the Far West. Like the southern route to California via Las Vegas, the emigrant trail seemed unnecessarily

long to men who desired to maximize the efficiency of communications between east and west. Moreover, as those interests grew, enough capital became available so that businessmen could invest in efforts to replace the unsatisfactory Humboldt route and southern route with a "central route" through the heart of the new territory of Nevada. Captain James H. Simpson of the United States Army first established the Central Route by his explorations in 1859, and those in the communications businesses -- the Pony Express, the Overland Mail and Stage, and overland telegraph companies -- lost no time in taking advantage of the newer, shorter route (Morgan 1943:233; Simpson 1876:41).

Simpson had not been the first to look for a shorter alternative path to the Pacific coast. In 1854 and 1855, two parties looking for the Central Route strayed into the outskirts of the Carson Sink. The expedition of army Lieutenant E.G. Beckwith probably crossed the northeastern rim of the sink, and the party of Captain E.J. Steptoe and Mormon scout John Reese most likely skirted the southern edge (Morgan 1943:223,226; Simpson 1876:map; Albright 1921:98). Another Mormon scout, Howard Egan, crossed the southern portion of the study area in 1858 on his way to Sacramento, but left no clear record of his travels. When Simpson entered the region in the summer of 1859, he tried to follow Egan's path through the Carson Sink. Within two months, Simpson had made both a westbound and eastbound trip through the region, looking for a wagon route from Salt Lake City to Carson City. The route offered fewer resources for water and feed than the Overland Train. At one point, in fact, Simpson tried to improve the strongly alkaline water by adding vinegar to it. Nonetheless, the route was adequate for the purposes of Simpson and western businessmen. He had found enough watering holes and grass patches, and he had publicized the route so much better than his predecessors, that the Central Route gained immediate recognition and use (Simpson 1876:84,107; Mordy and McCaughey 1968:226-227; Morgan 1943:233).

On his westbound route, Simpson entered the study area through the present Salt Wells Basin, crossed the sink north of Carson Lake, most likely, and moved up the Carson River to the settlement of Genoa. On his return trip, Simpson's party traveled along the Carson River and passed to the southern shore of Carson Lake. This route later came to be used by the Pony Express riders, while the more northerly route, used by Simpson on his westward trek, came to be used by the Overland Mail. In many cases, the express companies used the same camps and watering holes that Simpson had found in 1859 (Mordy and McCaughey 1968:226-227; Simpson 1876:104-106; Hardesty 1977:82).

George Chorpenning, official contractor to handle the overland delivery of the United States Mail, became the first to relocate his postal route to the new trail. Chorpenning's troubled career with the overland mail had begun upon his receipt of the contract in 1851. He first used the emigrant trail, via the Carson River route, to transport his wagons to California. Delays and obstacles rendered this service inconsistent and inadequate. Looking for a warmer, less troubled alternative route, Chor-

penning began to use the southern road to California in 1854. He had limited success there, too, and relocated back to the Carson River route in 1858, where he remained until 1860. In fact, it was in one of Chorpenning's stages that Horace Greeley had passed through the study area in 1859 (Morgan 1943:269-285; USDI/BLM 1976b:77-81).

To Chorpenning, the newer, faster route seemed like just the thing to cure the troubles of his overland mail and stages business. He moved to the new path in late 1859 or early 1860. In a matter of a few months, however, the federal government cancelled Chorpenning's overland mails contract, and a new firm, the Pony Express, took over the route. The three owners of the new firm, W.H. Russell, Alexander Majors, and William B. Waddell, immediately began pouring money into the ill-fated business venture. They bought horses, hired riders, and began to build stations across the state of Nevada. Ominously for the Pony Express, less than 13 months after their takeover an overland telegraph company quickly began to complete a transcontinental line along the same Central Route. Technology had already begun to seal the fate of the Pony Express and, ultimately, the Central Route (USDI/BLM 1976b:1,4; Morgan 1943:269-285; Mack 1936:343-347,349).

The Pony Express route through the study area generally followed Simpson's southern path through central Nevada. An eastbound rider would parallel the Carson River, pass to the south of Carson Lake, cross Simpson Pass, and move eastward beyond Sand Springs. Along the road the company built stations every 25 to 30 miles. In the general vicinity of the Carson Sink, two stations served the express riders, one just east and south of Carson Lake, along the shore, called Sink Station, and one to the east of Simpson Pass, called Sand Springs Station. At both spots, adobe station houses were built in March 1860, by Pony Express workmen. Both stations were located next to fresh water springs, and both featured designs that incorporated some defensive features in order to protect company personnel from Indians (Mack 1936:343-344; USDI/BLM 1976b:16-18).

The crude, harsh conditions at each station contribute little to the romantic legend of the Pony Express. The station by Carson Lake, today nothing more than adobe ruins, at one time had four or five structures. When Dan DeQuille, a correspondent for the Territorial Enterprise paper, visited it in 1861, its prominent feature was an eight-foot adobe wall, complete with openings for rifles, that enclosed a one-story house and some livery stables. DeQuille complained that there was little fuel for a fire. As it was summer, and the station's fresh water spring did not seem to be running, the occupants of the station had to use a lengthy pier extending into Carson Lake in order to fetch water that was not stagnant (USDI/BLM 1976b:5,16-17; Lingenfelter 1963:26,28; Edaburn 1979:10).

Simpson Pass lay between Sink Station and Sand Springs Station. From the crest of the pass, a westbound traveler would catch his first glimpse of Carson Sink (Hattori 1979:10; Beatty 1960:26-32). To the east of the pass was Sand Springs Station; rather, there were two Sand Springs Stations, one built a short distance from the other. Why the station was relocated is

not known. In the fall of 1860, Richard Burton made his way into Sand Springs Station on his way from Salt Lake City to Genoa. The station held little potential for the weary traveler; all Burton could find was "a roofless and chairless" shed, which he compared to the hovels of Ireland. Besides the "impure" floor, Burton complained that the house was "filthy and squalid, with a smoky fire in one corner" (USDI/BLM 1976b:5; Brodie 1962:491; York 1976:10).

In less than two years of existence, from April 1860 through October 1861, the Pony Express only lost money. When the Overland Stage and Mail line competed head-to-head with it, beginning in the summer of 1861, the Pony Express had very little chance of surviving. The completion of the overland telegraph in fall, 1861, marked the end for the short-lived firm. Pony Express stations, in some cases, were taken over by the new stage and mail line. Sand Springs station, for one, was kept up for the rest of the century. In other cases, however, the mail and stage company changed the route through central Nevada. Unable to cope with the steep climb and sandy soil of Simpson Pass, the Overland Mail relocated their line and stations to the north in 1863. Their new route went from Sand Springs through Mountain Well toward Stillwater, then veered toward the Old River and Desert Wells in the west. Short-lived stations, such as Wildcat and Hill, came into existence to serve the Overland Mail, too. Those stopping points, like the mail company itself, were able to endure until the coming of the transcontinental railroad in 1869 (USDI/BLM 1976b:1,14; Hardesty 1977:86-87; Hattori 1979:11; Mordy and McCaughey 1968:238; Browne 1972:1; Páher 1970:90).

Almost as soon as the Overland Mail Company supplanted the Pony Express on the Central Route, Benn Holladay, an entrepreneur who specialized in the stagecoach business, began to acquire the company from the old owners. He managed to prosper with his company, unlike others before him. Sensing that his prosperity might be short-lived, however, Holladay sold the company to Wells Fargo in 1866 at a handsome profit. Wells Fargo hoped to monopolize east-west stage and mail traffic for at least five years, but the transcontinental railroad was completed within three years of their purchase. Although Wells Fargo did not come near to making the profits they had expected, they ran stages along the old Central Route until the turn of the twentieth century. Today a well-traveled highway, U.S. 50, uses the same approximate path as the old stage and express route (USDI/BLM 1976b:84-86; Morgan 1943:280-285; Mordy and McCaughey 1968:234-235; Botti 1979:9).

IV. The Transcontinental Railroad, 1868-1903

When the builders of the cross-country railroad decided to lay their tracks along the Humboldt River, the Central Route to the south fell into gradual disuse. Although still employed through the 1920s as a route to mines in central Nevada, and continued today with Highway 50, it lost the esteem and traffic it had enjoyed during its heyday in the 1860s. The railroad, tied to sources of water and to the gentler terrain of the

Humboldt River and Forty-Mile Desert, quickly replaced most other communications and transportation routes to the Pacific. Even the telegraph relocated to accommodate the new railway.

The transcontinental railroad had been conceived during the 1840s and 1850s as one of the methods by which Americans could secure their control of newly acquired western lands and extend their modes of business and settlement to the western coast. Quite naturally, the tracks followed the Humboldt River through much of Nevada. At the mouth of Humboldt Lake the road turned on to the the Truckee River route, choosing the slightly shorter but steeper path over the longer but more level Carson route. The tracks were laid quickly through the study area during summer, 1868, less than a year before the final spike in the cross-country line was driven at Promontory Point, Utah Territory. With the railway came a number of train-related structures to central Nevada, including section houses, sidings, and stations (Galloway 1950:129; Myrick 1962:18).

At the height of railroad construction through the study area, a San Francisco reporter captured much of the activity in a series of newspaper columns. Like most first-time visitors to the area, he felt pessimistic about the future of the barren region. Nothing could be seen or grown, he thought, on such miserable land. The construction activity held a great deal more interest for him. He observed the line as it was advancing between Brown's Station (Toy, today), and Lovelock. The writer was impressed by the quickness and determination of the workers. One of their chief problems was getting enough supplies to "the front" to keep all hands busy. Another major dilemma was the acquisition of usable water for the line. The Central Pacific company had tried to dig wells, but had enjoyed no success. Moreover, as the reporter found out, the water from Humboldt Lake could not be used:

The water of Humboldt Lake, along which the road runs for some five-and-twenty miles, striking it near the eastern end of the desert, is full of alkali, and it causes the boilers to foam so badly that it is almost impossible to use it. It has, therefore, been found necessary to sink artesian wells in this neighborhood, though, as in one or two experiments, the engineers struck first salt water, and then hot water, the men on the road do not place much confidence in this resource, being inclined to believe that Humboldt Desert is too near the infernal regions to supply anything good in the form of water. In the meantime tank trains are employed to fetch water from the Truckee, and it has been found necessary to discard the Humboldt Lake water altogether, as, when mixed with that of the Truckee, it makes the boilers foam worse than when it is used alone.

Despite such troubles, construction sped through the desert at a pace of between five and 10 miles per day. In less than two months construction crews had entered and departed the study area, leaving a railway that would in some ways dominate further development of the region (Earl 1978:283-285;

United States Department of the Interior, United States Geological Survey (hereafter USDI/USGS) 1915:182).

The workmen on the Central Pacific road comprised two different groups -- the whites and the Chinese. The whites lived by themselves in "boarding trains" near the front. The chief engineer and the supervisors had special accommodations. Farther back on the line, the Chinese made their camps of small huts or tents, where they slept and had their meals on wooden cots. Because of the harsh working conditions and the lack of an alternative, the stream of Asians to and from the railroad work camps was constant. Chinese bosses combined with white supervisors to maintain what discipline they could in the hive of activities among the immigrant group. The work on the railroad introduced the Chinese to opportunities in Nevada; when the work was completed, many of them remained in the area, as at American Canyon in Pershing County, to work the second-rate mines of the region (Earl 1978:284-285; Barth 1964:117-119; Basso 1970:3).

As the railway stretched to the east, workmen for the Central Pacific constructed the buildings necessary for operating the line. Some of the stations or sidings, like Mirage and Cressid, have long since vanished with little trace; others, like White Plains, Miriam, and Toy, or Brown's station, have been better remembered. White Plains grew up on the Central Pacific line in the 1880s or 1890s, after salt production in the area made it worthwhile to stop there. Brown's station, near Humboldt Lake, had been transformed from an adobe stage station into a more permanent railroad depot. To the northeast, the Central Pacific company chose to build sidings and section houses at Toulon, Granite Point, Perth, and Woolsey. They also erected another station at the trading post of George Lovelock, naming it after that man. Other stops, like Oreana and Kodak, came and went with the fluctuations of economic activity -- mainly mining -- in the study area (Earl 1978:283-284; Elliott 1973:113; Hasch 1913:173; Rand, McNally and Company 1876; Rand, McNally and Company 1896; USDI/USGS 1915:179-183; United States Surveyor General Office (hereafter USSGO) 1890b).

Little more than three decades after the completion of the Central Pacific Railroad through Nevada, the location of the line was shifted from the Truckee River route through the Forty-Mile Desert to the Carson route. After years of financial trouble, the sinking Central Pacific company sold out to the Southern Pacific Railroad in 1899. Seeking to rebuild a line that had been allowed to deteriorate, the new owners set out a more efficient, more profitable line. In 1902-1903 and 1907-1908 the Southern Pacific relocated and rebuilt more than two hundred miles of track within the state. Among the first changes occurred on the line from Brown's to Sparks near Reno, in 1902-1903. Instead of remaining along the Truckee River route, the new tracks, as well as the new telegraph line, followed the Carson route to the south and southwest of the Humboldt Dike, thereby avoiding the steep slopes of "the White Plains hill." Though the distance was now greater, the flatter Carson route took less time and money to travel. As the SPRR tore down the old tracks and structures on

the Central Pacific line, they simultaneously erected the new stations at Huxley and Parran and the section house at Ocala. The new location did not solve the railroad's lack of water, as it still had to be imported from elsewhere, but the shift did contribute to the success that the Southern Pacific brought to the old line. Moreover, the redirection of the railroad gave greater impetus to the developers of lands around the Carson Sink, including the townsmen of Fallon and the people involved with the Newlands project (Myrick 1962:29, 31; Myrick 1969:41; USDI/USGS 1910; USDI/USGS 1915:182-183).

The relocation of the railway gave it greater strength for a time, but the railroad, like the emigrant trail, the Pony Express, and the Overland Mail and Stage, was also doomed to decline by new technology and modes of travel. The inevitable decline set in as automobiles and trucks increasingly supplanted the railroad in transportation throughout the Great Basin. Trains, of course, have proved more enduring than the emigrants' ox-carts, the overland stage coaches, and the express ponies of earlier times. But the construction of national and interstate highways through the region, paralleling older routes or else replacing them, has symbolized the overall pattern of newer, more advanced equipment replacing the old along lines of communication and transportation to the Pacific.

V. Contact Between White Passers-by and Native Americans, 1829-1869

Just as surely as one mode of transport replaced another, whites who entered the study area supplanted local Native Americans. Since first arriving in the region of the lower Humboldt and the Carson Sink, whites had come into repeated contact with nearby Indians. Within 20 years it became apparent that whites would largely dominate the ecology and resources of central Nevada; after another 20 years, traditional Indian ways would have been transformed substantially. The overriding theme of this interaction was withdrawal by the Native Americans in the face of the more aggressive and numerous whites, though instances of conflict and resistance on the Indians' part also took place. The observations of whites on these developments help to illuminate the pattern of contact that developed during the 40 years between Ogden's expedition and completion of the Central Pacific Railroad.

Initially, the Native Americans in the Humboldt Sink region seemed more inclined to assert themselves rather than withdraw. Peter Skene Ogden commented that the ones he encountered at Humboldt Sink were "more daring and bold Indians seldom as ever I have seen" (Cline 1963:8). Joseph Walker's expedition also found the Native Americans somewhat assertive; in fact, the whites and the Indians clashed twice in 1833-1834 in the now-famous battles by Humboldt Lake. Troubles between Walker's mountain men and the Indians apparently began upstream on the Humboldt when whites retaliated against the theft of their traps by Indians by killing "several" Indians on two occasions. The white offenders were reprimanded by Walker, for he feared that his small party could not stave off the wrath of unified Indian tribes. His fears almost came to be justified at Humboldt Lake

where his men encountered "between eight and nine hundred Indians," according to white estimates, who seemed menacing to the party. The gathered Indians, according to men in Walker's party, seemed to be intent on seeking retribution for the deaths of their tribesmen upstream. The whites grew nervous as the hundreds of Indians followed their small party along the sink toward the Forty-Mile Desert. Uncertain of what the Indians were planning, Walker gave them an ultimatum: they were either to disband and leave the white men alone, or the whites would attack (Watson 1934:50-55; Quaife 1978:116).

While one can begin to understand the apprehension and the reasoning of Walker, who feared for the safety of his expedition in the remote desert, it is unclear whether such an ultimatum was necessary, or even was understood by the Native Americans. The Indians made no signs of disbanding, so 30 of Walker's men charged some of the Native Americans, killed between 25 and 39 Indians in the ensuing "battle," and frightened away the rest. To the white men's way of thinking, this action may have been a form of self-defense. However, accounts of the battle suggest that the whites may have wanted to do more than scare the Indians off. As several of the Indians lay wounded on the ground, Walker's men proceeded to kill them. One historian who is sympathetic to Walker suggests that this was an act of mercy, putting the injured men "out of the misery" (Watson 1934:53-54). Another white historian, who seemed to revel in the incident and the success of the white attack, may have described the incident more accurately (Morgan 1943:51);

The shrieks of the dying mingled with the howling of those who ran for their lives. Swiftly reloading, the exultant mountain men fired again and then with loud whoops leaped off their horses, quickly put their knives into the ribs of the Diggers still living, and lifted their reeking hair. Triumphant they rode back to the company.

Although dramatized out of proportion, this latter account which portrays the white attackers as exultant mountain men seems more realistic than the picture of them as mercy killers out solely for self-defense. Zenas Leonard insisted that the men in his party merely intended to scare the Indians away (Quaife 1978:117), but the zealotry of the attack suggests otherwise. It has led one scholar to term the whites' response a "punitive measure" (Napton 1970:113,123). The attack no doubt did stem from motives of punishment and fear, on the part of the whites, but it also grew out of a common preconception of the Indians as "savage," less-than-human "Diggers."

Regardless of the white men's motives, it has become clear that the confrontation at Humboldt Lake in 1833 laid the foundation for future troubles between whites and Native Americans. Just the next year, on Walker's return trip through the same region, the whites and the Indians clashed once more. Once again, Leonard insisted that the mountain men strove to avoid the conflict, offering the Indians gifts and tokens of friendship. The Indians did not accept the whites' offerings, however, and the whites felt it would be best to attack once again. This time

they killed 14 Native Americans, and wounded many more (Cline 1963:174, 176-177; Morgan 1943:60). Combined with the first incident the year before, this second attack ensured that hostilities between whites and Indians would ensue in the region of the lower Humboldt.

No well-publicized conflicts of a similar nature to these battles at Humboldt Lake have come to light, but there is some scanty evidence that Walker continued to have trouble, and to make trouble, for the Indians in the vicinity. In his journal of 1844-1845, Edward Kern, who was travelling with Joesph Walker at the time, mentioned that he found near Carson Lake the "skulls of the natives killed here by Walker's party some ten years since." This would indicate that Walker may have had more trouble with the Indians during his return journey, trouble that Zenas Leonard did not mention in his account of the expedition. Kern also mentions an attack by Walker "two years since," referring apparently to an incident during Walker's participation in the emigrant party of Joseph Chiles in 1843 (Kern 1876:478,479). Kern may have confused both names and dates in these references, and the additional killings may have been nothing more than a misunderstanding about the two battles at Humboldt Lake. However, Walker himself was traveling with Kern at the time he wrote his journal in 1844-1845, so one begins to wonder why Kern would have been so confused about the different battles. In any case, it seems clear that the exploits of Walker and his men generated tensions between whites and Indians in the area (Elliott 1973:39).

When Kern himself described the Indians in 1844, he portrayed them as more withdrawn and less assertive, an observation that fits with the generally recognized overall pattern of Indian withdrawal in the face of the white man's coming to the western Great Basin in Nevada. Whereas Indians upstream on the Humboldt had been better dressed and had more horses than he expected, Kern found the Native Americans at Humboldt Sink "much more indigent and shy, hiding from us on our approach" (Kern 1876:478). These observations were made at a time with overland emigrants had just begun to trickle through the area. The relations between these first emigrants and the Indians were mixed. Members of the Bidwell-Bartleson party of 1841 learned how to eat an Indian form of "honey dew" sugar during their journey down the Humboldt, suggesting some peaceful interaction between the two groups. These specific travelers grew more wary of the unfamiliar culture of the Indians when they discovered that the sugar consisted in large part of "insects." In 1846 another relatively early emigrant party, led by Captain Jack Aram, conflicted with the Indians of the lower Humboldt. After the Indians had allegedly stolen and killed some oxen, the migrants retaliated by burning down the Native Americans' tule huts (Napton 1970:114,116). White reactions to these early contacts seem to have been mixed in nature.

Relations between whites and Indians probably began to deteriorate more definitely during the massive influx of Forty-Niners into the region. The argonauts of 1849-1850 came in numbers greater than ever before. Lands that had been long dominated by the Northern Paiute came increasingly to be used by white travelers. L.K. Napton suggests that the emigrants "must

have depleted literally all types of food resources along the California Trail in western Nevada." For the most part, the Indians could do little other than to move away from the heavily travelled areas. This pressure undoubtedly contributed to hostilities, too. Though the general Indian response was withdrawal, many tried to survive in the areas along the overland trail. One method they employed was theft from passing parties of whites. Sometimes the whites interpreted these as "ambushes," but the Indians were clearly trying to replace lost food resources (Mordy and McCaughey 1968:11; Napton 1970:116, 123-124; Remy 1861 I:58,76,85-86, 95-99).

Besides withdrawal from lands now controlled by whites, Native Americans might also try to survive by working for whites and learning white ways. In several instances, observers commented that Indians in the vicinity had performed seasonal work for whites in California. Ever on the lookout for signs of adjustments by the Indians to white ways, Captain James H. Simpson commented on two groups of Indians from the Carson Lake area. One group that he encountered lived along Carson Lake in "flimsy sheds." They fished the river and lake with a seine, and had evidently prospered beyond what Simpson expected:

They present a better appearance than the Diggers that we have seen, both in respect to clothing and features. Indeed, they act as if they had been in contact with civilization, and had to some degree been improved by it.

Simpson's respect for their improvement decreased, however, during a session of trading with the Native Americans when one Indian man offered his eight-year-old son in exchange for a jackknife. Simpson probably found greater reason for optimism about the future assimilation of Indians into white culture when he encountered another group of Indians from the Carson Lake area near Middlegate, east of the study area. Like most white Americans, Simpson valued the virtues of the agrarian life and hard work, and saw the attainment of those goals as sure signs of adjustment to white ways:

The Indians...appear to be industrious and able-bodied. I doubt not their present life is such as to make them facile subjects of husbandry and civilization generally. Indeed, I have been assured that some of them do hire themselves out as laborers in California for considerable periods of time -- as long as a year at a time -- and that they have been found faithful and to work well (Simpson 1876:85,86,106).

In 1855, Indian agent Garland Hunt also noticed some Indians in the vicinity of the lower Humboldt who spoke English and had been employed by whites as herdsmen and farm laborers. However, Hunt described something much more disturbing to the whites' way of thinking -- a group of 200 or so Indians in "poor condition" by the Sink of the Humboldt who had tried and rejected white ways of life. Most of these Native Americans,

who could speak English, had lived in California and worked for whites, but had decided to return to traditional Indian ways (Malouf 1966:22-23). Examples such as this must have struck a serious blow to whites who confidently believed in the superiority of their culture. They must have wondered how the seemingly impoverished Indians could possibly choose to retain their traditional ways after a taste of white civilization.

Another problem for whites was that the Indians would adopt the "wrong" white customs. Husbandry and industriousness were desirable features, but when Indians resorted to begging, often to make up for lost food resources and means of sustenance, most whites became contemptuous. Dan DeQuille noted that Indians habitually asked whites for some sort of "toll" as whites passed over their lands, and at all of the Pony Express or stage stations in the area, Indians inevitably could be found asking for handouts or offering their services for an exorbitant fee. Most whites scorned such behavior, but a few Indians and whites realized what had happened, as evidenced in one incident in the middle of the Carson Sink. Dan DeQuille's thirsty party, after crossing the desert, came to an Indian village and began to drink the Native Americans' water. The Indians demanded payment: "'Money, money, give me heap money.'" One old chief explained bitterly where the custom had originated (Lingenfelter 1963:10,38,140-142):

"It was a dirty whiteman's trick, and he would see that it was not again repeated." He said that they had caught the idea by seeing water sold at some of the wells on the deserts.

This incident typified the dilemma faced by Indians. Having had their traditional means of survival destroyed, they resorted to whichever expedient they could find. The resulting culture and patterns of behavior often pleased neither the whites nor traditional Indians. Caught between two cultures, the Native Americans of the lower Humboldt and the Carson Sink did not know which way to turn.

With these tensions building among the tribes of central Nevada, it might have been expected that trouble would break out at some point. The Pyramid Lake War of the early 1860s actually spilled over into the study area, and seemed to release some of the building frustrations among the Indians in the vicinity of Carson Sink and the lower Humboldt, though they were not involved in the war very significantly. Most of the Indian attacks centered on Pony Express stations and riders. At both Carson Sink Station and Sand Springs Station, whites encountered armed and hostile Indians in 1860 and 1861 (USDI/BLM 1976a:1-618; Hardesty 1977:97-99), and several employees of the express company lost their lives. Peace was restored quickly, however, with the establishment of Fort Churchill on the Carson River to the west of the study area in July 1860. The express and overland companies, too, adopted policies of paying off the Indians by giving them food (Mack 1936:307-312; USDI/BLM 1976b:84-86), thus contributing to the tenuous reconciliation between the two sides.

The establishment of a fort in the vicinity of the study area symbolized the end of an era there. The fort had been constructed to protect the interests of whites who now began to take more than a passing concern for the region. An influx of miners in the early 1860s, one of the causes of difficulties between whites and Native Americans, indicated one of the interests the whites had in the area. Routes for transportation and communication also needed protection. Moreover, the federal government felt the need to secure central and western Nevada Territory for "the Union" in the imminent Civil War (Totton 1978:1-2). Clearly, whites had begun to take a different view of the region of the lower Humboldt River and the Carson Sink. They came increasingly to value it as a possession, and to protect it from any perceived threats. Explorers and emigrants had already started transforming the ecology of the region to suit their own needs, displacing Native Americans in the process. Now, farmers, ranchers, and miners eyed the resources of the study area, and began to make inroads into it. They would finish the remaking of the ecology that had been initiated during the construction of routes to the Pacific.

Chapter 2

Settlers and Miners, 1860-1900.

In the early 1860s sustained white development came to the lands around the Humboldt and Carson Sinks in the activities of settlers and miners. Other regions in the Far West always attracted more non-aboriginal peoples, but after more than 30 years of passing traffic, a number of whites who entered the study area decided to make their livings there. Farmers and ranchers came to settle permanently, fencing the land, cultivating the soil, growing livestock, and building small towns. By the turn of the twentieth century they had made lasting homes for themselves in the middle of the desert. Miners, on the other hand, naturally approached the region without much interest in staying there. At first, in the 1860s, they hoped to find a wealth of precious metals in the area; indeed, some rich gold, silver, and copper claims were located in the rugged terrain that surrounds the lower Humboldt River valley and the Carson Sink. Most strikes in the vicinity were small and short-lived, however, and inevitably paled in comparison to the richer lodes of the Comstock, the Sierra Nevada, the Black Hills of the Dakotas, and even the Yukon, as the nineteenth century moved to its close. A few miners diversified into non-metallics like salt and soda, which required a more permanent but much less numerous labor force. By 1900, however, even those prospects lacked luster; the bright burst of mining had diminished to a dim flicker. Moreover, though agriculture and ranching had become well entrenched in the area, they only supported a small and generally unprosperous population by the end of the nineteenth century.

I. Forty Decades of Settlement, 1860-1900

Emigrant stations, like Ragtown and Brown's, and Pallen's Wells to the north of Lovelock, and stops along stage and express lines, like Sand Springs and Sink Stations, and Buffalo Springs in present-day Pershing County, were the first loci of white activity in the study area (Basso 1970:8,9,85). These small clusters of buildings, seasonally occupied by traders in the beginning, gradually became local centers of settlement. In the Lovelock Valley, for example, the family of James Blake claimed land and built a station for emigrants and the Overland Stage in 1861 on a spot that later developed into the town of Lovelock (Angel 1881:454-455; Napton 1970:119). To the south, the town of Stillwater had its beginnings near the site of Redman's Bridge over the Carson Slough, along the Central Route; by 1862 it had become a stop for the Overland Mail and Stage service (de Braga 1964:14-15; Mordy and McCaughey 1968:18; Paher 1970:91-92). J.J. Cushman and David M. Wightman began to operate an overland station along the Central Route at Mountain Wells in the early 1860s, and later became ranchers nearby (Townley 1977:4-5). Around the same time the St. Clair family started a ferry, a bridge, and a store on Carson Slough, three miles southwest of the present site of Fallon, at that time on the route from Carson Lake to Ragtown (Mordy and McCaughey 1968:18). By looking

at some of these settlements in detail, one can begin to understand the patterns of development in the region.

Lovelock Valley had earned a favorable reputation from emigrants because of its abundant grass. When the Blakes settled there in 1861, they began cultivating the nearby lands in order to supplement the income from the emigrant station. By 1862, the first irrigation ditches had been dug in the area, indicating the intention of permanent occupation there. The Blakes must not have had much success, however, because they sold their holdings to George Lovelock in 1866. Lovelock, an English immigrant miner, liked the area and began to settle in. By 1870 he had constructed a two story house and had developed a farm on his 160 acre plot. In 1868, he transferred 85 acres of his land to the Central Pacific Railroad; in return the railway company named the station they built there after him. The combination of permanent settlement, railroad station house, and a steady stream of business from miners during the period, ensured that Lovelock would become a lasting community. Dale Morgan described it as one of many new stops along the railroad, "treeless towns, smelling of new-cut lumber, sunbeaten, virile and young." Lovelock gained a reputation of sorts as tourist guides praised its fertile soil, and the young town began to grow (Napton 1970:119; Basso 1970: 58-65; Morgan 1943:305).

In the 1870s and 1880s all the signs of an expanding and enduring town began to appear in Lovelock. It gained a post office in 1875, with George Lovelock as postmaster. By 1880 it featured a school with fifty students from the surrounding valley. When Myron Angel compiled his History of Nevada in the 1880s, he counted four stores, three hotels, two saloons, one livery stable, and one blacksmith, besides the railroad station and the post office. In the nearby valley, approximately 400 people lived on farms and ranches, maintaining 6000 resident head of cattle and raising 1500 tons of grain. That non-resident livestock also passed through the region was evidenced by the presence of Basques in 1871-1872, when Jean and Grace Garat wintered with their cattle near the budding town. For much of this period Lovelock stood in the shadow of several booming mining camps in Humboldt County. When Pershing County was created out of Humboldt County in 1919, the newly incorporated town of Lovelock became the county seat (Basso 1970:58-65; Angel 1881:454-455; Douglass and Bilbao 1975:256-258).

Farmers and ranchers in the Lovelock Valley were plagued throughout the late nineteenth century by the undependability of water. Often the river suffered from dry years. Increased settlement during and after 1870 put a heavy strain on the river water, and probably introduced tensions into the valley as a result of water allotments. They also suffered from wet years, however. In 1884, partially as a result of a strong dam built across the cut in the Humboldt Dike, waters backed up into the Lovelock Valley, inundating thousands of acres of alfalfa; ranchers and farmers retaliated by dynamiting the dam. These alternating problems of flooding and drought continued on through the first half of the twentieth century.

Undaunted the ranchers and farmers in the area have remained, largely raising hay, alfalfa, and livestock (Napton 1970:61-62; Hulse 1978:225-226).

For the many settlers to the south, in what became Churchill County in 1864, Stillwater served as the central town in the Carson Sink. Ellem (Ellen?) Redman built a bridge across the lower Carson Slough in the very early 1860s, and a territorial act of 1862 authorized tolls for crossing the structure that ranged from two dollars for a six- or eight-team wagon to ten cents apiece for loose stock. The Overland Stage began to use the locale as a relay station in 1862, and the first settler, J.C. Scott, introduced farming and grazing to the vicinity in the same year. Other settlers began to trickle to the small town, and by 1868 it had a population of 150. In that year it supplanted the mining camp of La Plata as county seat (Mordy and McCaughey 1968:18; de Braga 1964:14-15; Paher 1970:91).

Never a very large town, Stillwater nonetheless acquired the necessary vestiges of civilization over the next two decades. In 1870 Churchill County's first school was built there, and a church was added five years later. Religion seemed to be important in early Stillwater, for a temperance society was founded there in 1880. By the following year, the town included a store, hotel, saloon, restaurant, post office, blacksmith, livery stable, courthouse, and jail. North and west of the town lay cultivated fields; to the northeast lay grass and tule lands, according to Myron Angel, terrain which later became a favorite spot for hunters. The soils were replenished often when the Carson Slough overflowed, but that also meant inconvenient flooding for the farmers and ranchers whose fields were affected. Although the lands were good enough to retain some settlers, the town began to decline steadily as the century drew to a close. By 1904, the town had been eclipsed by the new county seat at Fallon, near the Newlands project, and Stillwater's shrinking population amounted to around 40 residents (Angel 1881:361-362, 364, 365; Paher 1970:92; de Braga 1964:20,24,26,31; Writers' Program 1940:266).

In failing to prosper and endure, Stillwater merely repeated what other Churchill County villages had done. St. Clair, Ragtown, Hill, and Salt Well, among others, failed to grow as well. They lasted only so long as transportation remained so difficult as to make the lack of nearby services quite inconvenient. When settlers' ability to move around the county quickly and easily grew, a central town like Fallon became acceptable and more efficient. Until that time, partially each new ranch came to be known as some sort of town, or else ranchers and farmers settled close enough to one another to be able to call the neighborhood a town.

The settlers who came to Churchill County in the 1860s shared some traits in common. Most of them, for example, had originally intended to make it all the way to California. Asa Kenyon, the county's first permanent resident and the enterprising but unscrupulous founder of Ragtown, actually reached California during the Gold Rush, but returned to "mine" the emigrants instead. He set up a well at the edge of the Forty-Mile Desert.

By 1861, Dan DeQuille recorded, Kenyon had built a combination store and house, and a stable (de Braga 1964:10; Lingenfelter 1963:147). The family of Lemuel Allen represented another type of emigrant who became discouraged about reaching California. After running out of money on the Overland Trail in 1862, Allen and his wife Sarah stopped in the vicinity of Ragtown and began to work on local ranches and at nearby salt works. They then homesteaded near St. Clair. The Allen Ranch later grew to 2500 acres, and concentrated on the production of hay and dairy products. Like most families in the area, the Allens dug irrigation ditches to ensure themselves of a supply of water (Hill n.d.:1-5,8). Similarly, the Magee family decided not to continue to California in 1863, settling at the Grimes Ranch as hired help until they homesteaded near St. Clair a few years later (Elderkin 1967:1-2). In each of these cases, families chose the wide open lands of central Nevada over the more crowded conditions in mid-nineteenth-century California.

As the opportunities to prosper from emigrants and lines of communication decreased, agriculture and livestock became the most important sources of income for these settlers in the vicinity of Carson Sink. Those who compared the possibilities of central Nevada with those in California were perhaps persuaded to choose the former because of the large amounts of land available there. In fact, because early ranchers took large tracts of land, few small farms emerged in the area. In the arid climate the large tracts were essential to generating a profit. Without much land, the periodic dry and wet years and the often infertile soil might have combined to drive people away. Most farmers grew crops that were related to livestock, such as hay and alfalfa. In 1868 Treasury Agent J. Ross Browne tabulated that Churchill County produced 2500 tons of hay, 300 tons of grain, and some miscellaneous vegetables annually. He also found 400 horses, 300 cattle, and 300 oxen. The first herd of sheep reached Carson Sink in 1871. By that time, land owners had completed a network of irrigation ditches, and had begun to hire Paiutes as farm labor (de Braga 1964:21,29; United States Treasury Department 1868:333; Townley 1977: 9-10).

While these conditions of agriculture and ranching might have offered some promise, the difficulties of successful cultivation and grazing seemed to overshadow the advantages in central Nevada. A number of factors worked strongly against the success of settlers in the area. Foremost were the harsh climate and the inhospitable terrain. While crossing the middle of the Carson Sink in 1861, Dan DeQuille outlined some of the discomforts of life there. First, much of the water was undrinkable, "almost as strong as lye." In addition, virtually no fuel existed for fires -- DeQuille's party became weathered and burned, the hands chapped and raw. Persistent and numerous mosquitoes added to the discomfort. Most unbearable of all, perhaps, was the heat that beat down on the men and on the hardened ground:

We are standing far, far out in a desert. It is hot, very hot. The earth is hot. The air is hot. Every diminutive, stunted shrub, and every twig is hot -- you would not be surprised to

see them commence to smoke and burst out into flames. The earth on which we are standing is as level as a floor, and at no very remote period formed the bed of a lake of very muddy water (Lingenfelter 1963:32,134-135,139-142).

Besides such an unpleasant climate, the farmer encountered both man-made and natural obstacles to prosperity. Of all the land in the area, J. Ross Browne estimated in 1868, only 50,000 acres had much potential for hay or grain; the rest seemed useless (United States Treasury Department 1868:333). Once the earliest settlers had staked out their large plots, few good acres were left for latecomers or for families who hoped to add on to their holdings. The fact that the Central Pacific Railroad had rights to lands within 20 miles of either side of its tracks further increased the difficulty of securing usable acreage (United States Department of the Interior, General Land Office (hereafter USDI/GLO) 1876; USDI/GLO 1886). Moreover, because they lived at the bottom of the Carson River, farmers in the Carson Sink did not get enough water during dry years when upstream users got to use it first. Grasshoppers were a recurring problem, too. Finally, if the summer heat was not discouraging enough, the winters could be equally severe. Two consecutive harsh winters in 1889 and 1890 killed huge proportions of the livestock herds in both the lower Humboldt Valley and the Carson Sink. In the Humboldt River valley, upwards of 95% of the stock was reported to have died (Townley 1977:9,10,13; Morgan 1943:315).

Conditions such as these help to make it clear why the period from 1860 to 1900 was not very prosperous for settlers in the vicinity of the Humboldt and Carson Sinks. Too many factors limited growth in the region, and society had not yet developed the will or the technology to overcome the hardships. When these regional conditions coincided with statewide depression in the late 1800s, the future for the area seemed bleak. Only after the turn of the century did hope -- often misplaced hope -- begin to grow among the settlers of central Nevada.

II. Nineteenth Century Mining

Whereas farmers and ranchers managed to eke out a permanent living in the western Great Basin, miners came and went in large numbers. Many of their activities, like prospecting, have gone unrecorded, so the social history of mining cannot be written as thoroughly as one might like. Some records have been kept of most strikes in the area. However, since most of those strikes were minor and short-lived, even they have tended to fade into the past. In Pershing County, from 1860 to 1900, mining took place in the hills and mountains on both sides of the lower Humboldt River. Some of the claims produced a good deal of ore, and even generated enough interest so that mill towns were started along the river. Most of those claims died out quickly, leaving the local economy in a relatively depressed state around 1900. The fate of mining in northern and central Churchill County was largely the same, though miners there enjoyed somewhat better success. When metallic ores became less available after the

1860s, a large industry in the non-metallics kept Churchill County miners afloat until they too began to feel the depressed state of the economy in the 1890s.

The first prospectors entered the study area in the late 1850s because the mines in western California seemed increasingly less productive and less individualistic. Those looking for newer and brighter possibilities, as well as those interested in evading the large-scale industrial organization pervading mining in the western Sierra, moved into central Nevada along the Overland Trail. The regions around the Humboldt and Carson Sinks probably received more than their share of prospectors because of their proximity to the well-travelled trail. Moreover, the area lay along the route to the mining activity in the Reese River country, which developed in the early 1860s (DeGroot 1863). (For a fuller discussion of roads and post offices in the area, see Section III of this chapter.)

The first strikes in the mountains flanking the Humboldt River occurred along the eastern slope of the Trinity Range in 1859, approximately five miles west of Oreana. Silver prospects sparked this short-lived boom while later miners found gold, copper, and antimony as well. The Trinity mining district was organized in June 1863, the same year that the small nearby camp of Clarksville started and ended. Crude smelters and a stamp mill were built near the Trinity strikes in 1864 and three years later ores from the area helped to establish a smelter in Oreana. Around the same time, the Indian mining district, east by northeast from Oreana on the eastern flank of the Humboldt Range, came to be organized. Its one big silver and gold producer, the Moonlight Mine, lasted from 1861 to around 1875, producing more than \$100,000 in its first ten years of operation. Both the Trinity and the Indian districts were abandoned by the 1880s (Johnson 1977:61,96; Basso 1970:16,134; Paher 1970:115; Lincoln 1923:207, 220).

During the late 1860s another rash of strikes occurred in the northern portion of the study area. Exploration began in what later came to be organized as the Sacramento District, a few miles to the east of Oreana. Its biggest strike, the Humboldt Queen Mine, produced silver and lead from 1870 to 1919. Gold was found in the vicinity of Spring Valley, just to the southeast of the Sacramento district, also in 1868, and was mined intermittently there until 1910. After the completion of the transcontinental railroad, a number of Chinese workmen migrated to American Canyon in the Spring Valley district, to work placers for gold through the 1880s. A small Chinese community endured there until as late as 1910. The Eagle Mine, which later became the Bonanza King, was the district's largest single producer. By the late 1860's, the Montezuma Mine, 14 miles north by northeast of Lovelock, had become the leading silver producer in the region. It had long been the source of ore for mills at Oreana, and remained so until it died out after 1875 (Brasso 1970:3; Paher 1970: 125; Lincoln 1923:215-216,218; Johnson 1977:85,90-91).

Strikes came farther and fewer between after 1870. Silver was found in the San Jacinto district, on the eastern flank of the Trinity Range, in the mid-1870s, and was mined off and on until the 1920s (Johnson 1977: 86; Lincoln 1923:216). To the southeast, 25 miles from Lovelock, silver and antimony ores were located in the 1880s, but they never panned out very well, and were soon forgotten (Lincoln 1923:210).

Related to mining activity in the Humboldt and Trinity Ranges was the formation of several towns on the Humboldt River during the 1860s. Etna grew up first in 1865, and remained busy until the following year when Oreana proved to be too much competition. Etna lay 15 miles or so north of Lovelock on the eastern bank of the Humboldt River. It featured two stamp mills for processing ore, a hotel, saloons and stores, and a ferry to the opposite side of the river. Though put out of business for the most part by the mills at Oreana, the town lingered on until 1870 (Basso 1970:24-25; Paher 1970:126). Oreana, approximately three miles downstream from Etna, was located on the western side of the river. First settled in 1865, it grew to prominence in the latter years of the 1860s. Its boomtown quality arose from its stamp mills and smelters with the town providing the processing plants for mines like the Montezuma. At its peak in the late 1860s, the town featured a race track, gambling halls, boarding houses, a hotel, store, restaurant, butcher, blacksmith and livery stable, and a fluctuating population of between 200 and 300. Silver production peaked at \$45,000 for the year 1868, but declined thereafter. The town lapsed when the Montezuma Smelting Works burned down in the early 1870s. As the town was rebuilt, it was also relocated slightly (Basso 1970:79-82; Paher 1970:125). Torreytown, another short-lived mill town, lasted only one year in the late 1860s. Positioned one mile south of Etna, it could hardly withstand the competition from the other nearby mills and smelters (Basso 1970:131).

To the south, in what became Churchill County in 1864, mining started off around the same time. Two big strikes, the Desert Queen and La Plata, lent a degree of early success to the region, but like the mines in southern Pershing country, these had long since lost their luster by 1900. Mining at La Plata, in the Mountain Wells district on the southeastern tip of the Stillwater Range, began in 1862 and boomed throughout the mid-1860s. The silver camp of La Plata was so successful that it became the first seat of Churchill County in 1864. At one point in that decade, the district featured three stamp mills. By 1868, however, production had decreased to a virtual standstill. The demise of the district was symbolized by the relocation of the county seat to Stillwater in the same year. Some of the official buildings were dismantled, hauled to the new town, and rebuilt (Lincoln 1923:8; Willden and Speed 1974:80).

The Desert Queen Mine, at the northeastern end of the Hot Springs Mountains, enjoyed somewhat more success in the late 1800s. Unlike most strikes in the study area, this one has been well documented and can provide us with a detailed example of the nature of mining in central Nevada. Most likely, the gold claim at the Desert Queen was first

located in late 1862 or early 1863. For the next 27 years the diggings were worked steadily, and mining continued intermittently after that until 1900. In order to process their ore, the owners of the mine built the Desert Quartz Mill at a distance of two miles from the shafts in mid-1863. This stamp mill was intended to reduce the ore to gold, but was abandoned within a year and a half because too little water, and lumber for fuel were available nearby (USDI/BLM 1976a; United States Surveyor General Office (hereafter USSGO) 1882a; Willden and Speel 1974:66-67; United States Department of the Interior, Bureau of Mines (hereafter USDI/BM 1940:19; USDI/USGS 1915:181; United States Treasury Department 1868:334).

When the Desert Quartz Mill failed, a second mill was built 14 miles away at the outlet of Humboldt Lake, where a steadier supply of fuel and water could be obtained. The mill, finished, in 1864, was constructed by the Utica Bullion Mining Company from upstate New York, and on some maps the structure was labelled the Oneida Mill. Some have speculated that Horce Greeley took part in this venture, but this remains unconfirmed. In order to drive the mill by hydroelectric power, the company built an earthen dam across the natural cut in the Humboldt Dike, thereby assuring themselves of a controllable supply of water. Two floods washed away much of the dam in 1867 and 1876, but the owners replaced it with a stronger dam in 1877. In 1884, an extra-ordinarily wet year, Humboldt Lake overflowed. This time, however, instead of spilling over the natural dike as before, the excess water backed up the Lovelock Valley, flooding the fields and pastures of farmers and ranchers. Angry residents of Lovelock Valley dynamited the new dam at the cut in the dike. The onrush of water resulting from the explosion moved downstream this time, into the old Humboldt Slough and over its banks. This flood damaged the salt works below Humboldt Lake. The dam was eventually rebuilt, though production at the Desert Queen had slowed by this time; when a United States Geological Survey observer passed by in 1915, he noted that the dam was still in operation (Napton 1970:61; USDI/BLM 1976; USDI/USGS 1915:181; USSGO 1890a; USSGO 1890b).

Other mining districts formed during the 1860s in the study area were the White Cloud and Sand Springs districts. Near Sand Springs Marsh, a small silver strike was made in the early 1860s, but it never became a big operation. The district came to be much better known for its non-metallic production (see below) (Lincoln 1923:8-9). The White Cloud district, on the western flank of the Stillwater Range, was organized in 1869 after a significant copper strike was made at Coppereid, fifty miles northeast of Fallon. After the discovery a small smelter was built and it was operated at least into the 1890s. The copper discovery sparked the rise of the town of Coppereid to a population of 40. The small community began to plan for a larger-sized community at the foot of White Cloud Canyon, on the eastern edge of the Carson Sink, but production fell off. The mining in the White Cloud area revived periodically, in the 1890s and from 1907 to 1912, but little more than prospecting has taken place in the last six decades. By 1972 all that remained of the old mining camp were the foundations of buildings and several waste dumps (Lincoln 1923:13-14; Paher 1970:93; Browne 1972:1).

For the most part, mineral production in the vicinity of the Carson Sink was limited to non-metallics after 1870. The strikes near Cox Canyon, on the western side of the Stillwater Mountains, were the main exception to this pattern. Dan DeQuille had encountered some "Spaniards" (most likely Mexicans) prospecting near the mouth of Cox Canyon as early as 1861, but organized mining did not get under way there until the 1870s. At that time, Cox Canyon became part of the IXL District, an unproductive unit that produced little more than petty strikes of silver and gold (Lincoln 1923:6; Willden and Speed 1974:3,66; Lingenfelter 1963:133).

By the time that the IXL District was organized, the chief mineral products in the study area were salt and soda. Earnest salt mining had begun in the early 1860s, but received little attention until most metallic mines had been played out. Non-metallic minerals in Churchill County had been recognized as a potential resource since the first emigrant parties passed through the area. When the Central Route was created through the vicinity of Sand Springs Marsh and Salt Wells, nearby salt resources became more publicized. By 1868, J. Ross Browne of the United States Treasury Department realized that the entire sink could be examined for many types of non-metallic ores (United States Treasury Department 1968:333). The geological history of the area, observers came to realize, gave it enormous potential for exploitation by miners.

Salt production in the area actually began in the early 1860s, when the resources along the Central Route, in the vicinity of Fourmile Flat and Eightmile Flat, came to be noticed and exploited. Various referred to as the Sand Springs or Salt Wells deposit, this saltfield supplied much of the Comstock Lode's need for salt in silver reduction processes in the 1860s. As early as 1861, Dan DeQuille noted the shipments of food and supplies going toward Sand Springs from Virginia City, and the shipment of salt headed the other way (Lingenfelter 1963:160-161). Since the salt flats lay on the road between Virginia City and Austin, as well as on the Overland Mail route, they offered relatively easy access. By 1863, the Sand Springs Marsh District had been formed to regulate mining in the area, and a \$175,000 refinery had been built by the Sand Springs Salt Mining Company. In the next few years production peaked at a monthly output between 150 and 250 tons which sold for up to \$50,000. To accommodate the laden wagons of salt, a toll road from Sand Springs to Virginia City via Fort Churchill was completed in 1865. Production from this district ceased in 1870 when it was supplanted by the Eagle Salt Works, which lay closer to the Comstock mines (de Braga 1964:15-16; Hardesty 1977:87-88; Lincoln 1923:13,89; Edaburn 1979:10; Paher 1970:93,95; USDI/USGS 1883:544).

Accounts of early salt production in the Salt Wells area inevitably mention the refinery there, built in 1863. However, in the mid-1880s, when salt production apparently resumed, the process had been simplified. In the winter, according to United States Geological Survey observers, water collected in a small lake in the vicinity, or formed a marshy sink. A crust of salt was formed around the edges of the marsh or lake. Workmen would break the crust up with wooden hoes, rake the salt into long ridges,

and allow the salt to dry and evaporate in the summer heat. The salt was then carried off to be sacked and shipped. In certain spots during the summer or in dry years, the salt did not even need to dry. It could simply be shoveled into sacks and transported away (USDI/USGS 1883:544; USDI/USGS 1885:234-235).

In addition to salt, borax was also mined in the area. When the Eagle Salt Works took away local business in 1870, the operators tried to convert to production of borax. They constructed a small plant near Salt Wells, and began to produce at the rate of one ton daily, or twenty tons per month, in the period 1870-1872. The business died out by 1875, and only the remains of the processing plant exist at the site today (Lincoln 1923: 9; Willden and Speed 1974:49; York 1976:8; Botti 1979:19).

At the Soda Lakes, north and west of the present site of Fallon, additional non-metallics were mined from the late 1860s until 1893. The lakes had been discovered in 1855, but their potential for soda carbonate was only recognized in the late 1860s. A Treasury Department agent noted that soda was so plentiful and easily available that it could simply be shoveled into containers and shipped immediately (United States Treasury Department 1868:333). Production began at Little Soda Lake in either 1867 or 1868, and soon reached the annual rate of four or five hundred tons. In 1869, the operators tried unsuccessfully to mine borax from the lake, too. By 1875, efforts to extract soda from the larger Soda Lake began, but did not proceed beyond the "experimental stage" until 1885. From that time until 1893, the two sources of soda carbonate supplied between three hundred and eight hundred tons per year, but production then ceased. The soda works were flooded in 1907 (USDI/USGS 1885:74,79,80; de Braga 1964:12; Willden and Speed 1974:49,54).

To the northwest of Soda Lakes, in the vicinity of the Desert Queen Mine, the Eagle Salt Works were started by B.F. Leete in 1869. Due to their proximity to the Central Pacific Railroad, and to the Comstock Lode, these salt works were able to undersell those at the more distant, less accessible site near Salt Wells. At the Eagle Salt Works, salt was readied for shipment by draining brine into troughs or vats, and allowing the moisture to evaporate. The short-lived town of Leete emerged in 1876, and acquired a post office from 1877 until 1899. Production at the site remained steady until 1902, and then became sporadic until 1915, when the works were closed down, having generated a total output of more than 500,000 tons. The demise of Eagle Salt Works began in 1902 when the conveniently close Central Pacific line was torn up in favor of the new Southern Pacific Railroad along the Carson River route. The owner of the plant was able to convince the Southern Pacific company to leave every other tie in the tracks from Leete to Wadsworth, and the new, lightweight Eagle Salt Works Railway was formed. Completed in 1903, the tracks remained unused until 1906-1910. The Southern Pacific, who had loaned money to Leete in order to allow him to continue business, foreclosed on the dying business in 1910, but was unable to make money itself there, and gave the salt works up in 1916. Some of the original evaporators and foundations

still remain, but the old railroad was disassembled (USDI/USGS 1885:233-234; Myrick 1962:51; Paher 1970:111,113; Browne 1972:2; Willden and Speed 1974:53).

The year after salt mining began at the Eagle Salt Works, Walter Schmidt (or Smith) formed the Desert Crystal Salt Works in the alkali flat near White Plains. Schmidt recognized the potential of salt extraction in 1870, and proceeded to build two sets of salt works in the playa. The first set of evaporators was constructed near Huzley, a future station on the Southern Pacific line, just to the south of where it diverged from the old Central Pacific grade. The evaporators there consisted of ditches and 8500 linear feet of troughs, 55 feet wide. The brine was poured into the ditches, and the sun evaporated the water, leaving marketable salt. Once dry, the salt was moved into the wooden troughs for further drying and storage. In the same area, Schmidt proceeded to build a stable and a house, some salt licks, and a salt mill for refining the product. Most of the product of this salt works, as well as the other set, went to silver camps for the reduction of silver ore.

The other set of solar evaporators was located about four to five miles northwest of Huxley, in the middle of the playa. This set was much closer to the original Central Pacific Railroad, and a wagon trail from the salt works to the tracks connected the two entities. At the junction of the trail and the tracks, the small town of White Plains emerged in the mid-1870s. The town grew up around the business of the Desert Crystal company, and became a railroad depot as well. A telegraph office and post office were established there in 1879 and in the next decade, the weekly Churchill News began its inconsistent career as the county's first newspaper. The post office lasted until 1909, and the paper until 1912, though decline had begun to set in when the Central Pacific route was rebuilt in 1902-1903. Salt production continued until around 1915 or so, but very little production occurred in the final decade. The combined output of the two salt works had never been more than 200 tons per year (Lincoln 1923:14; Willden and Speed 1974:53; Paher 1970:113; USSGO 1890b; Hasch 1913:176; USSGO 1890a; USDI/USGS 1883:543-544; USDI/USGS 1909 I:471; USDI/USGS 1915:182).

After 1900, production of non-metallic minerals in the study area declined, as the opportunities in ranching, farming, and the precious metals brightened. Two brief efforts at producing salt and lime, however, were sparked by the relocation of the transcontinental railroad to the Carson River route. When Parran station was planned in 1902, on the new Southern Pacific line, the Kinney Saline Deposits Association built a salt works nearby, hoping to capitalize on the nearby transportation. However, production lasted no more than seven or eight years. The operators generally shipped their salt to ranchers in the area, but the market must not have been very large. Within ten years of the opening of the plant, production had ceased. A passer-by in 1915 noted that the works "had not been operated for several years" (USSGO 1902; USDI/USGS 1915:183). To the north of Parran, near the station at Huxley, miners

began to derive lime from limestone in a kiln in 1910. The operation lasted less than five years, probably, for the kiln appeared abandoned in 1915 (USDI/Bureau of Mines (hereafter BM) 1940:37; USDI/USGS 1915:182; Edaburn 1979:7). By this time, these non-metallics had ceased to interest the miners and prospective settlers in Churchill and Pershing County. Nevada's second mining boom had begun, and new strikes of precious metals proved far more attractive. Moreover, the Newlands Project had rejuvenated agriculture in the area, and people turned toward farming in order to find a more settled, more steady means of existence (see next section).

III. Roads, Trails, and Post Offices

Like the mining camps, short-lived towns, emigrant stations, and post offices, roads and trails through the study area appeared and disappeared through the nineteenth century. No accurate record of all roads has been maintained, but by consulting several historic maps, one can begin to see where different routes through the study area, besides the main routes already described, were made. Henry DeGroot, an amateur cartographer and alleged doctor, drew two maps of the study area in the early 1860s that included some of the well-travelled paths in the region. In his "Map of Reese River Mining Region," 1863, he depicted two trails from Ragtown to Sand Springs, one via Stillwater and Mountain Well, and the other to the south. These probably corresponded to the Overland Mail Route and the Pony Express route, respectively. The next year, in his map of the entire state, DeGroot retraced the routes that he had sketched the previous year, and added another route from Ragtown to the Humboldt Sink, which would correspond to the Carson River branch of the Emigrant Trail (DeGroot 1864a; DeGroot 1864b).

In one of the only instances of actual white activity in the most desolate reaches of Carson Sink, "Parker's Map, 1886" depicted a road running northward from Ragtown toward Lovelock through the desert. Instead of following the old Carson River route through the natural dike and by Humboldt Lake, this trail crossed the northwestern corner of the sink, and passed through the West Humboldt Range into Lovelock Valley. The significance or reason for this road is not known; by 1908 it had disappeared from maps of the region (Napton 1970:71a-71e).

Besides the trails to and from the small towns and mining camps in the area, postal routes and post offices were established, and disbanded, throughout the late nineteenth century. In his study of the postal history of Nevada, R.P. Harris listed the following post offices in the study area:

Ragtown, May 1864 - May 1867
May 1884 - April 1887
Stillwater, January 1865 - January 1868
February 1868 - April 1870
February 1877 - April 1899
La Plata City, April 1865 - November 1867
Oreana, February 1867 - July 1869
February 1870 - September 1873
October 1873 - March 1883

Eagle Salt Works, July 1871 - September 1871
 (and Leete) June 1877 - January 1912
Loveloek's, February 1875 - present
St. Clair, February 1877 - February 1905
White Plains, June 1879 - July 1909
Salinas, April 1880 - October 1882
Brown or Brown's, July 1881 - November 1881
 April 1884 - February 1887
 December 1895 - January 1896
Hill, May 1882 - July 1912
Fillmore, April 1884 - December 1886
Foltz, March 1892 - March 1904
Clemens, Clements, October 1892 - June 1895

Postal routes varied throughout the 40 years from 1860 to 1900, and the amount of service varied, too. In 1897, the United States Post Office made six deliveries per week over the route from Leeteville to Stillwater via Hill, St. Clair, and the new stop at Fallon. It made one delivery per week from Stillwater to the southeastern portion of the county. Lovelock had daily service, too; in addition, a once-a-week route ran from Lovelock across the top of the Carson Sink to Boyer east of the Stillwater Range (Harris 1973:passim; United States Post Office Department 1897).

By the late nineteenth century, these postal routes covered lands that were only sparsely occupied. Settlers had claimed parcels of land throughout the region, and a few new centers of settlement, such as the future site of Fallon, continued to grow. But at the end of the 1800s, prospects for future growth seemed minimal. Farmers and ranchers had only been able to make a meager living in the area, and most mineral strikes had been too small or too short-lived to give the area further impetus for growth. This retarded pace of development in the region merely served to heighten the economic depression that the entire state of Nevada was feeling in the last two decades of the century. In the 1880s and 1890s, Nevadans began to debate the future of their state, and began in earnest to seek solutions to the long-term depression that plagued them. In the years after 1900, some of these plans blossomed, and economic prospects brightened, changing significantly the course of history in the Carson Sink and Humboldt Sink region from 1900 to 1940.

Chapter 3

"An Oasis of Green in the Otherwise Gray Landscape": The Myth and Reality of Conquering the Desert, 1900-1940.

The slow, plodding settlement of the lands around the Humboldt and Carson Sinks during the late 1880's contrasted greatly with the dramatic cycles of boom and bust, and hope and despair in the first four decades of the twentieth century. Nevadans emerged from the economic doldrums of 1880-1900 with novel ideas and renewed determination. In the region around the Carson Sink and the lower Humboldt River, both the depths of depression and the heights of excitement came to be exaggerated beyond the levels evinced throughout the rest of the state. In the early years of the new century, the Newlands reclamation project and the state's second mineral boom whetted the appetites of residents in central Nevada for expanded growth and rapid prosperity. To a certain degree the increased expectations came to be realized. However, disappointment often seemed to overshadow the moderate successes of those who lived in the vicinity of the Lovelock Valley and the Sink of the Carson. Mining booms tended to die out; the promises of the Truckee-Carson project were only partially and dissatisfyingly realized; and repeated efforts during the 1920's and 1930's to capture the prosperity that had been so elusive from 1900 to 1919 were rewarded with only limited success. To a great extent, the story of white Americans in the Great Basin has revolved around their efforts to remake the ecology, with the help of co-operativism, government, and technology. In the study area the efforts have often been to little or no avail.

I. From Despair to Optimism: The Background of Reclamation

In Nevada the reclamation movement arose out of the hard times during the last 20 years of the 1800's. With the decline of mining in the state, and especially with the decline of the Comstock Lode, Nevadans plunged into a state-wide depression. The burden of the state's economy shifted to agriculture and ranching, but the harsh climate and stingy lands of the Great Basin combined to darken the prospects for agrarian occupations. Farming had not yet gotten a strong foothold, either in the state as a whole or in the study area. Ranching had enjoyed some success in the early 1880's, but in the last half of the decade the bottom fell out of the livestock market. Then, the harsh winters of 1889 and 1890 decimated the herds and created a shortage of feed. During the early 1890s, the nadir of the economic slump was reached. Out of this troubled period came the advocacy and development of reclamation.

Nevadans began to realize that they could depend neither on mining nor ranching for a stable economy. Both were subject to wild fluctuations that militated against steady economic or demographic growth. Farming offered both the diversification and the stability that Nevadans desired in their economy. In order to develop agriculture, however, Nevadans needed more

water, much more water than they had at their disposal in 1900. This generated a state-wide interest in reclamation, and a state agency was formed during the 1890s to promote irrigation and reclamation (Elliott 1973:173-175; de Braga 1964:34).

Boosters of the state economy seized upon the idea of reclamation with enthusiasm and began to sell the scheme to both residents and prospective residents of the state. The Nevada State Bureau of Immigration, in 1894, praised in particular the potential of the "level land" of the Carson Sink:

The large valley about the Carson sink is a favorite wintering ground for stock, owing to its mild climate due to the low elevation -- from about 3,850 to 4,000 feet above sea level -- and the almost total absence of snow.

More than the opportunities for ranching, however, the Bureau lauded the prospects for farming, and no doubt overestimated both the current and the future development of the area:

In the sink region...are not less than 280,000 acres of fine level land, susceptible of irrigation at a moderate cost, from either the Carson or the Truckee river. A considerable area in this valley is already under irrigation, but as in other parts of the State, comparatively little is devoted to general farm crops, the major part being employed for the production of wild hay and pasture. The soil of the valley is generally a dark loam of great depth and richness....

After these exaggerations, the Bureau proceeded to cite the proximity of the railroad, the availability of artesian wells, and other alleged advantages of farming in the sink (Nevada State Bureau of Immigration 1894: 68-69). Such boosterism, however, hardly stood a chance at overcoming the economic slump that pervaded Nevada. In addition, the state reclamation agency enjoyed equally small hope of success, as it was underfunded and underpowered as regarded the expensive, interstate project of reclamation (Elliott 1973:174-175).

Nevadans fortunately had other factors working in their favor. One was an ever-increasing nationwide interest in the problem of reclamation. In The Conquest of Arid America (1900), W.E. Smythe typified a new attitude toward the problem of irrigation in the United States. Around the turn of the twentieth century, Americans concerned with the morality and economy of the country pointed to three major threats to the national way of life -- the closing of the frontier, the rise of the city, and the beginning of imperialism. Ever since the Superintendent of the Census had announced the closing of the frontier in 1890, Americans had begun to worry about the future of their society. The nation, they thought, had always used the frontier as a safety-valve for overcrowding, as a reservoir of land to absorb the unemployed, as the breeding ground and the reaffirmation for democracy and individualism, and as a supply of raw materials. With the

apparent closing of the frontier, more Americans would have to live in urban areas, the nation's "crowded cities festering with vice and poverty." The very moral soundness of the country seemed threatened. Moreover, in a period when Americans became anxious about imperialism, Smythe asked why we should risk the troubles and the moral dangers of overseas expansion and colonization when the arid West had enough room for another 100 million. Why should we migrate to other parts of the world, he wondered, when we could just as easily "colonize" the Great Basin?

To Smythe, and to many other Americans as well, reclamation would be a moral and material triumph, a method of avoiding the potential dangers of imperialism, and a way to sustain agrarian virtues and values. In short, it seemed to be the road to the "highest forms of civilization." For Smythe, one of the most obvious sites for reclamation development was western Nevada, where the Carson, Humboldt, Truckee, and Walker Rivers appeared to be untapped. He envisioned that the rivers draining from the Sierra Nevada in the west would irrigate a million acres, while the Humboldt from the east would salvage another million acres. Combined together, the reclamation resources of Nevada seemed to make it ideal for the development of agriculture by irrigation and the preservation of the American way of life (Smythe 1900:xiii-xvi, 199-206, 308-310). Reinforced by current notions of progressive reform, efficiency, and conservation, the idea of reclamation offered bright hopes for both the country and the state of Nevada.

In addition to growing national sympathy for the reclamation movement, Nevadans profited from the services of their elected officials in the United States Congress. William M. Stewart, Senator during the late 1880s and the 1890s, and Francis G. Newlands, Representative from 1892 to 1902, and Senator from 1903 to 1917, kept the issue of reclamation in front of the national legislature until the Arid Lands Reclamation Act of 1902 was passed. Stewart first began to press the issue of government-sponsored irrigation projects in 1887. His general scheme was to return all federally owned lands in the arid west to the state governments. Then, the states could sell the lands and use the revenues for financing the construction of dams, canals, and reservoirs. Stewart's plan ran up against strong opposition at the national level, and he was forced to bide his time. Through most of the 1890s, the issue of reclamation came to be relegated to a secondary position as the question of silver pre-occupied Nevada's elected officials, but the matter was not forgotten (Townley 1977:19-20).

Toward the end of the 1890s, Newlands began to revive interest in the project. Newlands believed sincerely in remaking the desert into an agriculturally productive region. He had initially worked at the local level, buying a good deal of land around the lower Carson River in the expectation that it could be used later for an irrigation project. Newlands shifted his focus to the national level, however, when he became more established and powerful in Congress, and when he saw the weakness of state projects in Nevada. Moreover, Americans like W.E. Smythe were coming increasingly to look upon reclamation as the solution to a host

of national concerns. Newlands drafted a reclamation bill and presented it to the House of Representatives in 1901, where it languished for a time. The Congressman was initially unable to garner enough support, even in the Far West, to push his bill through.

The breakthrough came in late 1901 when Theodore Roosevelt replaced the assassinated William McKinley. An ardent conservationist and progressive, Roosevelt gave immediate backing to the bill, ensuring its ultimate success in Congress. By mid-June 1902, the bill has passed through both houses of Congress, and Roosevelt wasted no time in signing the act into law on June 17, 1902. The dreams and hopes of many Nevadans seemed to be within grasp now, as federal officials looked toward the Truckee-Carson area as the proposed site for the launching of the first reclamation project to be sponsored under the new legislation. By awarding Nevadans with the first project, the federal government seemed to be acknowledging the efforts of Francis Newlands in passing the bill. Newlands himself, long a believer in the virtues of agriculture and the need for growth in his home state, was now close to achieving the goals he had worked so hard and so long for. Nevadans began to anticipate the imminent period when their economy would be diversified and liberated from the cyclical nature of mining (Townley 1977:17-26; Elliott 1973:175).

As originally passed the Reclamation Act of 1902 applied to the 16 states of the continental Far West, and was later extended to Texas. Under the legislation, the payments made by homesteaders for claiming and settling lands in the arid West would be pooled into the Reclamation Fund. Money from the fund would go to pay for reclamation projects. Once the projects were in operation, the users of project lands and water would repay the fund over a period of ten years. Later additions to the law provided for a longer period for repaying the fund, for the conservation of water, and for the development of hydroelectric projects. The act also founded the United States Reclamation Service, a federal agency that would be in charge of the projects in the arid West. As the progress of reclamation in Nevada became public, Nevadans rejoiced at their good fortune. In the first of many ill-considered predictions, reclamation officials promised that virtually all of central western Nevada would benefit from the project. United States Reclamation Service planners announced that settlers around Lake Tahoe, in the Carson and Truckee River basins, along the sinks of the Humboldt and the Carson, and in Lovelock Valley, would all be able to acquire project water and lands, an estimated 400,000 acres. Moreover, the immediate prospect of federal monies pouring into the state, and into Churchill County in particular, created excitement and optimism in the study area (Townley 1977:27; United States Department of the Interior, Bureau of Reclamation (hereafter USDI/BR) 1942:22-23; Glass 1971:3-5).

Confidence now began to replace the doldrums that had typified depressed Nevada in the late nineteenth century. Boosters and promoters began to have a field day as the project got under way. Representative, perhaps, of the attitudes was the Passenger Department of the Southern Pacific Railroad. The railroad stood to profit from the project because the value of its lands through Nevada would increase significantly. In 1911 the company published a pamphlet that confidently portrayed the prosperous future of

central Nevada. Trees would grow, orchards would blossom, "the heat of summer and the winds of winter will be modified, and these reclaimed lands will be for all time an oasis of green in the otherwise gray landscape" (Wells 1911:36). Anyone that even came into contact with the project, it seemed, would almost automatically be successful. By 1911 agricultural yields had already increased by as much as fifty per cent, and new crops, such as sugar beets, promised an even rosier future. Virtually no difficulties were in sight: "The conquest of the desert has begun wherever a home is builded ((sic)). The home is secure and the harvest of the fields certain as long as the rivers run" (Wells 1911:33-36). The Newlands project promised to be everything for everybody; farmers, families, speculators, railroad companies, progressive politicians, nativists, anti-imperialists, and traditionalists all expected to benefit from reclamation in the Great Basin. That so many expected so much from the project, that Nevadans had swung from the depths of depression to the zenith of optimism so quickly, made it virtually inevitable that sharp disappointment was to follow.

II. The Success and Shortcomings of the Truckee-Carson Project, 1900-1940

Construction began on the Truckee-Carson project in 1903 with the building of Derby Dam on the Truckee River and the digging of a diversion canal that took the Truckee's water to the Carson River. Land was opened to settlers for entry in early 1905 when the first extra water began to flow all the way to the Carson and beyond. The Reclamation Service mapped out several townships in the Carson Sink, mostly in the vicinity of Fallon, the new county seat of Churchill County. Immediate results were mixed on the project; more land than before was indeed settled and cultivated, but many of the newcomers could not make a go of it in the strange new environment. Nor did settlers claim all the available new lands. Moreover, weather and inadequate planning conspired to limit some early successes. The first two years of actual operation of the project, 1905 and 1906, were quite dry, and water for irrigation was depleted by mid-summer. During the next year, there was so much precipitation that floods resulted, inundating virtually all of Fallon. Officers of the Reclamation Service realized the need for water storage facilities, and began the construction of Lahontan Dam and Lahontan Reservoir in 1911, a three year project. When completed, the new dam impounded more than 250,000 acre-feet of water, and promised to provide hydroelectric power, giving renewed hope to entrymen. The early years had been troublesome for the project. Initial interest in the new lands and water was high, but it dropped off sharply with the problems of weather and shortage of water, as well as other problems mentioned below. But the completion of the Lahontan Dam, and the wartime stimulation to agriculture, reassured Nevadans who hoped to benefit from the project (Townley 1977:31-46; Edaburn 1979:7-8; Nelson n.d.:9; Hulse 1978:222-223).

Indeed, some success clearly resulted early on in the Newlands project. The United States Reclamation Service made sure that "several hundred miles of small canals were built to distribute the water" throughout the Carson Sink. The University of Nevada added its capabilities by setting up

agricultural experiments in the Lahontan Valley and Carson Sink (Hulse 1978:222-223; Wells 1911:36; Edaburn 1979:8). Certainly, although their rate of increase was slow and unsteady, farmers saw the project as an opportunity to get ahead. They had always had trouble prospering in central Nevada, and had generally been less successful and less powerful than ranchers in the area. For perhaps the first time in the area, farmers were guaranteed water, giving them an advantage over those who raised livestock (Martin 1922:90). Slowly, farmers trickled into the Lahontan Valley. There were 75 farms in Churchill County in 1905, and 400 in 1908. In 1910, about 1600 people lived on 420 farms in the project area, and cared for 9000 head of livestock. Although it was not generating as much prosperity as promised by advance publicity, the Carson-Truckee project was providing more opportunity for growers in the area (Creel 1964:12; de Braga 1964:51; Hulse 1978:221). Besides the additional potential in agriculture, the project brought money from the business of construction. Even when farms were not flourishing local residents could often find work during the early years in building the project. Work camps had to be constructed, in fact, for laborers imported from the outside. During the construction of Lahontan Dam, small, temporary towns emerged on the worksite. White Americans were housed away from the other ethnic groups on the project, including Eastern Europeans (Townley 1977:41; Nelson n.d.:5-6). These workers helped to bolster the regional economy in the early going.

While more farmlands were opened up, and while more water became available for agriculture, these benefits were not readily apparent to many of those who suffered the hardships and heartbreak of the early years on the project. A host of problems plagued entry men in the Lahontan Valley and in Carson Sink. As has already been mentioned, expectations were unreasonably high, and bound to be unfulfilled. Reclamation officials and development promoters were partly to blame for these inflated expectations. The USRS had predicted that a string of canals would extend the irrigation to the Lovelock Valley. Uncertain about how much water they really would have, they severely overestimated the amount of reclaimed lands in the project. Water shortages became a problem from the very beginning. Another prediction was that Fallon would grow so rapidly that it would shelter at least 10,000 people by 1920, and maybe even more than that. The optimism with which Nevadans entered upon the project tended to gloss over the realities of establishing farms in the area. Many new homesteaders came woefully undercapitalized, and simply did not have the resources or the credit to hold out for the three years or longer that it took to begin returning a decent harvest from the salty, alkaline soil.

The inconsistent and troublesome weather, moreover, limited the yields of the first 15 years on the project. In addition, farmers tended to stick to the one crop that is best-suited for the lands of the Carson Sink -- alfalfa -- and by so doing ran the risk of a glutted market in that product. Since the project intended to benefit cultivators of the soil, ranchers felt slighted and left out of the opportunities. During the period 1907-1910, mineral strikes in the state tended to attract potential settlers away from the area and when the strikes died down, so

did the demand for agricultural products from project farms. Inadequate storage slowed growth as officials had to withdraw lands from settlement in order to complete the Lahontan Dam from 1910 to 1914. Project planners were unable to secure the use of Lake Tahoe for storage for surplus water, as a result of lawsuits filed by property owners on the lakeshore. Alfalfa crops were threatened by the alfalfa weevil although that challenge was taken care of with relative ease. Other insects would prove more damaging to other crops in the future. In addition, project officials tended to mistreat local Paiute farmers with the result that their tribal agricultural economies were ultimately ruined, and many Indian landholders were forced to become tenants. Finally, tensions developed between old farmers in the area, and the newly arrived engineers and advisers whose judgment and promises often dissatisfied the entrymen (Townley 1977:27,41,42,43; Glass 1971:6-9).

These early problems were reduced, in part, when farmers prospered as a result of increased prices during the First World War. The completion of Lahontan Dam assured water storage and helped to compensate for the loss of the use of Lake Tahoe. Despite this brief taste of success and prosperity, however, problems soon engulfed the project once more. Many stemmed from earlier difficulties. When the prospects for farming leveled off in the 1920s, lingering resentments became prominent once more. Project farmers generally remained indebted to the government, and continued to distrust the federal authority. The unrealized growth and unforeseen expenses took their toll on relations between the entrymen and the Reclamation Service. After the crises of confidence that revolved around overblown promises, inadequate water supply, poor drainage, infertile soil, and unsteady markets, other issues cropped up. Farmers began to think that they had too little participation in making decisions about the project. They felt that in addition to being misleading, Reclamation officials had been insensitive as well. Disagreements also arose over repayment schedules for government loans, for many farmers were not able to keep their heads above water for the first few years. One outgrowth of these tensions was the formation of the Truckee-Carson Irrigation District (TCID) in 1926, which in many ways supplanted the old USRS. The irrigation district, unlike the federal agency, was both operated by and directly responsible to the people in the Carson Sink and Lahontan Valley. Farmers received additional relief when they were given broad extensions on their loan repayment schedules (Townley 1977: 53; Glass 1971:9-10).

The increase in local control probably helped to soothe project farmers temporarily, but they began to have troubles once more in the 1930s. From 1902 to 1930, more than \$8 million had been poured into the Truckee-Carson system by the federal government, and water users and landholders were obligated to make up that loss. The area had certainly benefited from the money spent there, but during the Great Depression only a few could continue to make payments to the federal government. Farmers became too impoverished in the 1930s, relying on Farm Security aid. The town of Fallon, which had always expected to reap great profits as the commercial center of the agricultural development, had to survive economically during the 1930s by Works Progress Administration (WPA) jobs. By 1940, the government had

written off approximately 75% of the project costs (Writers' Program 1940: 265-266).

As the country began to pull out of the Depression in 1940, horizons brightened for residents of the Lahontan Valley and the Carson Sink. They began to reconsider the project, and come to understand its limits. In 1940, the project was capable of irrigating around 67,000 acres year round, but only 48,358 had been claimed and needed irrigation. In addition to the water and lands provided at cost, the Newlands project also offered water storage and hydroelectric power. The three generators at the power plant at Lahontan Dam produced a total output of 1500 kilowatts. Other fringe benefits were recreation areas associated with the reservoir, and the Fallon National Wildlife Refuge, established by executive order as part of the Newlands project in 1931. Finally, by 1940 the water users actually controlled the operation themselves, and had been excused from much of the burdensome debt incurred in building the project (Glass 1971:10; USDI/BR 1942:81, 82,85,87,89-91).

Despite the bright outlook, however, problems still gnawed at the users and observers of the irrigation system. Farming had not really been able to overcome ranching by this time, suggesting that the ultimate goal of the project -- to elevate agriculture to a supreme position in the Nevada economy -- had not been achieved. Moreover, the farming that had been successful generally depended on the crop of alfalfa. This was neither different from what farmers had grown before the project, nor independent from the stronger, more profitable interests in livestock. Other promises -- about irrigated acreage, about the amount of water, about the success of Fallon -- remained unfulfilled (Glass 1971:10):

The population of Fallon, the county seat, has remained low (under 3,000); Churchill County's population is probably still under 9,000. Only the building of a Naval auxiliary air station during World War II brought a new infusion of population and government money. The amount of irrigated land in the project has seldom reached 70,000 acres.

By 1963, more than a thousand new farms and ranches had been started in the area.' The federal government had invested less than ten million dollars, and crops had exceed \$90 million in value by the early 1960s, exclusive of livestock. It seemed to matter less that the project had not nearly lived up to its expectations. Most simply assumed that despite its earlier tribulations, the Newlands project was an unequivocally beneficial addition to the area. Nonetheless, people continued to complain that water was being wasted on lands that did not deserve to be reclaimed. Moreover, a protracted struggle between the Pyramid Lake Indians and the Truckee-Carson Irrigation District had developed over rights to the water of the Truckee River. The Indians generally lost ground during the battle, joining the large numbers of whites for whom the Truckee-Carson reclamation project had become a disappointment (Hulse 1978:224-225; Elliott 1973:386).

Others have traced the story of the Truckee-Carson project more thoroughly than can be done in an overview. John M. Townley, Turn This Water Into Gold (1977), and Mary Ellen Glass, "The First Nationally Sponsored Arid Land Reclamation Project" (1971), should be consulted for balanced accounts.

III. Fallon, the Project Town

Now that the broad outlines of the Newlands project have been sketched, it should be useful to go back and examine more closely some of the outgrowths and extensions of the reclamation system in Churchill County. Foremost among the related developments was the rise of Fallon in the early twentieth century. As with many of the spin-offs from the Truckee-Carson project, Fallon failed to live up to exaggerated expectation, as has been discussed already. Nonetheless, it did become the most important town in the Carson Sink, the county seat, and served as headquarters for the Newlands project.

In the late nineteenth century, the vicinity of present-day Fallon was devoted to raising stock, and at the center was the ranch of Mike Fallon. A post office was established there in 1896, and the town started to grow. Fallon began to expand rapidly in 1902 with the beginning of the irrigation project and the removal of the county seat from Stillwater, 12 miles to the east, to Fallon. The community had only two businesses in 1902; by the end of the decade it was a rapidly growing commercial center of Central Nevada (Hasch 1913:179; Edaburn 1979:6-7; Writers' Program 1940:265-266).

In addition to the impetus of the reclamation development in Lahontan Valley, Fallon also profited from the renewed mining in Churchill County. In 1905 and 1906; the strikes at Fairview and Wonder, to the east of the town, created a great deal of traffic between the two new mines and western Nevada. Fallon became the jumping-off point for those strikes, and served as the nearest supply center (Writers' Program 1940:266; Edaburn 1979:7). Newcomers to the town and those headed toward the mines camped at Fallon in tents, and systems of transportation between Fallon and Fairview arose. From 1905 to 1911, plans were made to construct an electric railway between the two points, and a grade was even built along the old Overland Mail route. Tracks were never laid, however, and most transportation was by teams of horses. This new traffic revived for a time the old towns of Salt Wells, Hill, and Sand Springs as stops and watering holes for teamsters (Edaburn 1979:2,14; de Braga 1964:40,43; Browne 1972:2; Paher 1970:93; Hardesty 1977:89-91).

Fallon never quite grew fast enough to reach the predicted population of between ten and fifty thousand, but from 1902 to 1920 its progress was significant. Those who lived in the town certainly realized that it was getting larger. Housing became very scarce, and although construction proceeded at a rapid pace it did not keep up with the town's rate of expansion in the early years, forcing many to dwell in tents. In 1904 Central Fallon featured one wide main street, one restaurant, one hotel,

one store, and two saloons. The next year it burgeoned to three hotels, four boarding houses, seven restaurants, and seven saloons. The town was developing so steadily that it was able to endure the flood of 1907 and the large fire of 1910, which did more than \$75,000 in damage. In 1912-1914, partly as a result of the completion of Lahontan Dam, Fallon acquired municipal lighting, electricity, sewers, and water, for a total of \$80,000. By 1915 it had acquired the grounds for the Nevada State Fair, held annually at Fallon until after World War II. The presence of the state fair at Fallon seemed to underscore its character as an agricultural center (de Braga 1964:46-50,56,61; Townley 1977:42-43; Writers' Program 1940:266).

As the locus for many activities related to the Newlands project, Fallon was also the center for many failures. Hoping to capitalize on the improvements from irrigation, optimists in the Fallon area were defeated in a number of ventures to find a staple crop, and in the development of a socialist community. In the first years of the Truckee-Carson project, the sugar beet fiasco stands out as representative of the unfulfilled hopes attached to reclamation in Churchill County. The idea of growing sugar beets was probably planted by the conclusions of the University of Nevada Agricultural Experiment Station, which predicted great success for the crop as early as 1904. Farmers came to believe the sugar beets would be impervious to the alkaline soils, and soon promoters took up the argument as part of their booster literature. One promoter went so far as to predict that 20-30,000 acres in Lovelock Valley could be devoted to the crop (Townley 1977:73; Wells 1911:35-37). Intending to exploit the new crop, the Nevada Sugar Company organized and began to build a plant and boarding house for processing beets. Construction started in 1910, and in 1911, after an expenditure of \$600,000, the sugar beet factory opened on the outskirts of Fallon (Edaburn 1979:2-3; Nelson n.d.:12,13; de Braga 1964:59-60).

The completion of the factory marked the crest of a wave of optimism in Lahontan Valley. The reclamation project had certainly had its troubles up to this point, but now that a staple crop in beets seemed to be within grasp, the future seemed secure. Both the growers on project lands and the townspeople of Fallon saw the sugar beet industry as one of the keys to a prosperous life. No sooner had the factory opened for production, however, then troubles, and ultimately failure, set in. The factory operated steadily from 1911 to 1914, not at full capacity, but with enough production to whet the hopes for success. After another brief spurt of activity in 1917, the plant remained closed until 1927. Beets had failed to take hold in the reclaimed lands of Churchill County. Following a series of crop failures, leafhopper insects were found to be the source of the destruction of the crops. Moreover, even when some beets had been grown, they never paid as much as hay in the agricultural economy of the region. As a result, when the sugar beet factory reopened in 1927, it has little chance of remaining in business. The bottom fell out of the beet market, and the plant was closed forever. It was sold in 1928 to a junk dealer, and dismantlement began. During the early 1930s, when Prohibition was still in effect, what remained of the plant housed a still which contained ten vats with 18,000 gallons total

capacity, as well as two stills that held another 5,000 gallons. True to the form of the region's fortune in that period, even the still was put out of business by the repeal of Prohibition. After 1934 the abandoned plant was sold as scrap metal to Japan (Nelson n.d.:13; Townley 1977: 73-78; de Braga 1964:59-60).

The failure of sugar beets was not felt so sharply at first, for agricultural prices improved during World War I. When agriculture slumped in the 1920s and 1930s, however, the failure was felt more keenly. During those decades the search continued for another staple crop, but it never really succeeded. From 1920 to 1930, farmers tried to replace the old standby, alfalfa, with cantaloupes. The scheme enjoyed some success at first, but the fruit was fragile and the quality was hard to maintain. When prices dropped sharply in the first years of the Great Depression, most growers gave up on cantaloupes and reverted to alfalfa (Townley 1977:61,71-72,79-86). Other staples were proposed and tried, but ironically they relied much, much less on reclamation and irrigation. Alfalfa remained king among farmers in the Lahontan Valley. Farmers experimented with poultry in the 1930s, and had some success, but the market for Fallon turkeys largely collapsed after World War II when outside competitors began to dominate the field. Apiaries produced a good deal of honey for the area, but like poultry they did not really depend on irrigation for success. The most successful alternative to alfalfa was the livestock industry. Livestock had been profitable in the area before the Newlands project, but the beginnings of irrigation had turned most attention away from ranching toward farming. After World War II, the beef industry began to grow once more, ultimately reaching a par with alfalfa. Dairying has also been successful. Begun just after World War I, this business initially involved more than two hundred family dairy farms. The industry has become much more concentrated today, with less than a dozen firms controlling the market. The search for an alternative to alfalfa has largely ended and people have realized the limits to the Newlands project. Most of the success in the present agrarian economy comes from ranching and dairying, or from livestock-related crops like alfalfa (Townley 1977:87,95-103,105,119; Writers Program 1940:265-266). While reclamation succeeded in opening up new lands for agriculture, it failed to change the orientation of rural life in central Nevada.

At the same time that technocrats and engineers were trying to overcome the desert in central Nevada by way of the Newlands project, socialists were trying to build Nevada City four miles east of Fallon. The community got underway at a time when socialist politicians were having some success in the state, capturing as much as one-quarter of the vote in several elections. Moreover, the colonists stood for pacifism and non-involvement in the European War, which many Nevadans agreed with prior to the entrance of the United States into the conflict. Consequently, when the first buildings arose on project lands near Fallon, most central Nevadans were willing to tolerate the socialists in their midst. For their part, the

socialists hoped to found a farming co-operative to prove their economic theories. Even more important, they hoped to become the capital of a successful socialist movement, one that would ultimately win both the state and the Far West for socialism (Elliott 1973:237-238; Shepperson 1966:Chps. 1-3).

Vision soon clashed with reality in the Carson desert. The colony did in fact seem to prosper initially; it acquired lands in and around the Carson Sink, and began to attract both national and international attention. A stream of American and European communitarians flocked to the experiment, where the originally simple and straightforward brand of socialism became an impossible mixture of ideas and ideals. The socialists had large plans for an advanced socialist community with all the necessary comforts for a good life in the desert, and they began to build for the future. However, the colony never came close to completing its project. The community peaked with a population of around 200 in 1918, housed in as many as 36 buildings. Despite the heterogeneous and transient population, the community had begun to publish a newspaper by that time. They had even acquired another plot of land by the Humboldt Dike near the sink, a 480-acre ranch:

The ranch which belong to H.C. Taylor lay astride the main line of the Southern Pacific Railroad near Ocala and was wedged between the Carson and the Humboldt Sinks. Two small frame buildings were constructed to supplement the living quarters provided by the old ranch house.

The Humboldt Ranch, as the acquisition soon became known, was to be the site for one of the major incidents in the downfall of the colony (Edaburn 1979:9; Paher 1970:9; Shepperson 1966:108-112).

The pacifist views of the colonists had at first been acceptable to rural Nevadans, but when the United States entered the war, they gradually became less and less tolerant. The hysteria about security at home, so prevalent during wartime, began to appear in Churchill County as residents in the area began to fear that the socialists would dynamite the Derby and Lahontan Dams in an effort to hinder the strong local war effort (Townley 1977:64). Tensions between patriotic Nevadans and the socialists finally reached a head in the spring of 1918. Opposed to the war in Europe, the socialists encouraged one of their youths, eighteen-year-old Paul Walters, to resist induction into the military. Instead of reporting to army officials, Walter went into hiding at Humboldt Ranch near the natural dike. Churchill County Sheriff Mark Wildes set out to arrest young Walters in mid-May 1918. During a confrontation on the Humboldt Ranch on May 19, Wildes was killed by a bullet allegedly fired from Walters' pistol. Incensed local citizens offered a reward for the young suspect, and he was killed five days later by bounty hunters (Shepperson 1966:155-165; Townley 1977:66).

This tragic incident proved to be the final blow to the fledgling socialist colony in the Carson Sink. The co-operative farmers, like other

users of project lands, had been unable to produce a decent harvest from their lands, and were deeply in debt. The Walters-Wildes incident merely served to direct increased hostility at the colonists. As a result of the problems, the community plunged toward dissolution. It finally went into receivership on May 1, 1919, in the midst of a national Red Scare that threatened all open socialists. By the end of that year, the buildings abandoned by the socialists had been occupied by oil-seekers who had flocked to the area during the petroleum rush of 1919-1920. In another 25 years, the United States Navy, an ironic opposite to the pacifist socialists, renovated and occupied the abandoned buildings again until housing for recruits stationed at the air base near Fallon was completed. Like other hopeful experiments associated with the Truckee-Carson irrigation system, the Nevada Colony Corporation failed completely to create a new life on reclaimed lands in the Nevada desert (Elliot 1973:237-238; Edaburn 1979:9; Shepperson 1966:passim; Townley 1977:69,132).

IV. Farming and Ranching without Reclamation: The Lovelock Valley, 1900-1940

The original plans for the Truckee-Carson project included the Lovelock Valley as one potential target of development. Reclamation officials soon realized that there was too little available water for all of the Carson Sink and Lahontan Valley, let alone the basin of the lower Humboldt River. Nonetheless, Lovelock Valley continued to be mentioned when the Truckee-Carson project's potential was discussed. As in the Carson Sink, the valley was best suited to alfalfa and livestock, but farmers there were also encouraged to grow beets in that short-lived enterprise. Also, although it would never receive any of the water from the Newlands project, one promoter suggested that the promise of a more secure water supply in the study area made prospects in Lovelock Valley all that much brighter (Wells 1911:37).

Despite such claims, Lovelock's rate of growth did not increase very much from the last third of the nineteenth century through the first third of the twentieth. By 1915, it had become the center for a valley that depended on ranching, some farming, and nearby mining activity for its prosperity. In 1900 more than 14,000 acres had been irrigated in the valley, but most were devoted to alfalfa. Activity in the town of Lovelock picked up in 1919 when it became the seat of the newly formed Pershing County. Nonetheless, the town remained slow to develop until agricultural development began to accelerate during the 1930s (USDI/USGS 1915:179-181; Hulse 1978:124,225). The increasing success of agriculture in the 1930s resulted in part from the construction of the Rye Patch Dam upstream on the Humboldt. In 1933 ranchers and farmers in Lovelock Valley borrowed money from the federal government, purchased water rights from upstream ranchers, and began to store water in a reservoir in the northern part of the valley. The Rye Patch Dam was built in 1937 with federal aid and created an artificial lake about 20 miles long. Valley ranchers and farmers profited by the water storage project because it ensured them a steady supply of water for the long summers. However, the dam did little to control flooding in the valley. The

region had suffered chronic flooding problems in the late nineteenth century, and more flooding occurred in 1912. The construction of Rye Patch Dam was seen as a way to prevent or reduce floods. Nonetheless, flooding recurred in 1945 and 1952. As with the Newlands project, the effort by growers in Lovelock Valley to control water and make better use of the lands was only a limited success (Hulse 1978:221,225-226; Napton 1970:61-62). Fortunately for both regions, the local economies received boosts from mining throughout the twentieth century which helped to compensate for the uncertainties of agriculture in central Nevada.

V. Not a Green Oasis, but Veins of Silver and Gold: Mining in the Carson and Humboldt Sink Areas, 1900-1940

In the vicinity of Lovelock Valley, the largest strike in the early twentieth century was in the Rochester District, where the camps of Upper and Lower Rochester, Panama, Packard, and Limerick produced a great deal of silver and gold. A small strike had been located in the area as early as 1860, but real development did not begin until Joseph Nenzel discovered a rich silver lode there in late 1912. By 1913 more than 2200 miners and camp followers had come to Rochester and the rush was on. Despite the problems of too little water and lumber, the boom town of Rochester soon emerged, complete with newspapers, hotels, offices, frame houses, schools, a post office, a race track, and a music hall. Production reached \$500,000 by the end of 1913, and continued to grow until 1920, bolstered in 1916 by the discovery of new sources of silver in the rich Plainview Deposits. The boom lasted until the Great Depression (Paher 1970:126, 129; Basso 1970:92-102; Johnson 1977:79).

Related to the strikes at Rochester were the construction of the Nevada Short Line Railway and the growth of nearby mining camps. In order to get the silver ore to processing plants, the Nevada Short Line Railway was built in 1914, connecting Rochester to the Southern Pacific line, five miles to the west. The year following completion of the railroad, a mill was built at Rochester, so the need for the railroad diminished. It was wrecked in 1918 and later torn up. During its short existence it had renewed activity at Oreana on the Southern Pacific Railroad, which was promoted from a siding and section house to a station during the boom at Rochester (Myrick 1962:57-63; Basso 1970:93-96; Paher 1970:125-129). In addition to Rochester, the towns of Packard, Panama, and Limerick were founded in the area. Packard was the site of both a cyanide mill, for processing gold ore, and the mines themselves. From 1913 to 1923 the mines produced steadily, and have been worked intermittently since then. During its first ten years, the mill produced more than \$1.5 million in precious metal -- not nearly as much as the output at Rochester, which approached \$10 million, but still a substantial amount for such a short-lived camp (Paher 1970:129; Basso 1970:84,92-102). Limerick and Panama were other short-lived towns near Rochester, rising in 1913 and dying by 1920. Both towns never achieved populations of more than one hundred (Basso 1970:56,86).

During World War I, a host of other strikes were made in Pershing County. The Sutherland Mine, in the Black Knob District at the northern end of the Humboldt Range, and mines in the Wild Horse District, south of Lovelock on the county line, produced antimony during the war and in the late 1940s (Johnson 1977:55; Lincoln 1923:201-202,221). Around 1915 a short-lived gold strike was made at Willard, which later came to be known as Loring. A small camp grew up around the diggings of the Shepherd Mine, and a thirty-ton mill was completed at nearby Kodak for processing the ore. The camp lasted but briefly (Paher 1970:123; Lincoln 1923:209). Just west of Humboldt Lake, on the border between Pershing and Churchill Counties, the Ragged Top District emerged in 1915. From that year until 1920, its main products were limestone and tungsten; it later produced more tungsten from 1952 to 1956 (Johnson 1977:77-78). Also on the county line, but to the west of the Sink of the Humboldt, the Juniper Range district was formed to regulate the mining of copper and tungsten. Intermittent production of tungsten continued through 1961 (Lincoln 1923:208; Johnson 1977:63).

In some cases, districts formed in the nineteenth century continued to produce into the twentieth, and new types of ores were mined within the old boundaries. In the Sacramento District, the Humboldt Queen Mine continued to produce until 1919. For six years there was little activity in the area, but from 1925 to 1949, the district became one of the country's biggest producers of dumortierite, which was used for insulation in early models of spark plugs (Johnson 1977:85). The old Spring Valley and Trinity districts also gained new life in this period. Small gold finds were made in Spring Valley from 1905 through 1914, mercury was extracted in 1906, and silver and lead were mined in the mid-1930s (Johnson 1977:90-91). To the west in the Trinity Range, small gold placers were worked from 1939 through 1963 (Johnson 1977:96). Finally, the Mineral Basin District, site of early iron, silver, and antimony strikes in the 1880s, produced iron ore relatively consistently from 1943 through at least 1964. Many of the mines in this district were owned by the Southern Pacific Railroad (Willden and Speed 1974:78; Johnson 1977:68-69; Lincoln 1923:210).

In Churchill County to the south, the major new find of the early twentieth century occurred in the Jessup area in 1907. Like other mining activity during this era, the find contributed to the second statewide mining boom. At Jessup, the first gold claims were found in 1907 and 1908, creating a small boom camp, and a series of additional shafts were sunk in the area. The town of Jessup burgeoned to a population of 300 at its peak in 1909. Despite the absence of wood and water and the inaccessible mountain terrain, enough people braved the elements to attract three grocery stores, two lumber yards, a meat market, a daily stage to Huxley on the Southern Pacific line, and seven saloons. After the initial flurry of activity, however, the veins of gold proved to be quite shallow. Decline set in in late 1909, and the town of Jessup

disappeared soon afterwards. By 1940, only \$15,000 in gold had been recovered, although prospecting and claims in the area have been continued until the present (Willden and Speed 1974:77; Nevada State Inspector of Mines 1909:122; USSGO 1911; USDI/BM 1940:35-36).

Throughout the Stillwater Range, an area of much activity in the 1860s and 1870s, mining has continued from the first decade of the twentieth century to the present. In the White Cloud District, copper mining that had begun in the 1890s continued to 1912. After a long interlude, copper was mined again from 1948 through 1952 near the old site of Coppereid (Lincoln 1923:13-14; Willden and Speed 1974:88). In 1904 and 1908, prospectors searched for gold and silver in the IXL District, but managed to find only small amounts. The Copper Kettle District to the north enjoyed greater success as a producer of copper from 1908 through 1929, although production was only intermittent (Lincoln 1923:2; Willden and Speed 1974:64). A small gold strike took place to the south in Shady Run Canyon in March 1908, but it had died out by summer. The same district had more success as a producer of tungsten in the late 1950s and early 1960s (Lincoln 1923:9; Paher 1970:93; Willden and Speed 1974:82). At the southern end of the Stillwater Range, in the Mountain Wells and Sand Springs Districts, small productions of gold (1919), silver (1919, 1930), and tungsten (mid-century) kept mining interests alive in that area (Willden and Speed 1974:80-81; Lincoln 1923:8).

In addition to the interest in precious metals, observers of mining in Churchill County witnessed an oil boom in the early 1920s that matched any other mineral boom in its fervor and speculativeness. Like most strikes in the area, however, this one too proved to be unsuccessful. Geologists had suspected that there was oil in the area as early as 1904, but financial backing was slow to appear. Finally, by 1918, enough capital had been invested to begin sinking wells into the ground, and the boom was on. Drilling companies were formed, and oil stocks were sold as the boom picked up speed. Drillers and planners proposed to set up rigs at the southern end of Humboldt Lake, and near Desert Wells, Salt Wells, Stillwater, and Fallon. Much of the commercial activity, too, revolved around Fallon, increasing its number of businesses. However, nobody really made much money off the boom, as no oil was ever located. Speculative ventures collapsed, and the economy of Fallon lost the brief surge it had enjoyed. Some of the prospective wells did result in "gushers" of hot water, demonstrating the geothermal potential of the area, but at the time few cared about the unusual energy source. The oil boom only seemed to add to the long series of heartbreaks for residents of the Carson Sink in the early twentieth century (Townley 1977:67-72; Nelson n.d.:13-14; de Braga 1964:30-31).

One comparative success that was continued from the nineteenth century was the mining of salt near Sand Springs. Rights to the saltfield were acquired by C.W. Kinney in 1904. He organized a new company, the Diamond Salt Mining Company, to operate the salt works, but had little success. He sold out in 1927 to a man named Thompson, who began to invest seriously

in the salt mine. He formed the Nevada Pure Salt Company, which he capitalized at \$250,000. Much of the money went toward building a four-story mill complete with kiln dryers and a fifty-pound brick press. He also laid down the first truly serviceable road into the salt flats, at the cost of \$25,000. Thompson died before he could make much of the works, and mismanagement ensued. The Fallon Development Company acquired the works and allowed the equipment to deteriorate or be sold off. Elmer Huckaby leased the salt works in 1938, and after making the necessary improvements, began to produce salt in larger quantities than ever before. The demand for salt during World War II launched the saltworks into a full-time enterprise (Huckaby 1959:entire).

As with the prospering saltworks, much of the rest of central Nevada found greater economic security during and after World War II, bringing to a close the troubled and turbulent period of optimism and heartbreak, of great promise and disappointing depression. As in many other parts of the United States, rural central Nevada had a difficult time adjusting to modern technology and modern needs. Efforts to strengthen and diversify the local economy only served to reiterate, for the most part, how vulnerable that economy really was. Attempts to alter the orientation of rural life, or to build a new society in place of the old, generally fell short of their goals, leaving to the mid-twentieth century the task and the benefits of adapting more successfully both the limits of the geography in central Nevada, and the modern era of agriculture and commerce. Much of the activities in this new era, it turned out, would be shaped by the region's interaction with the federal government.

Chapter 4

Wildlife Management, Naval Aviation, and Water Rights: Government and the Humboldt and Carson Sinks, 1940-1975.

With the beginning of World War II, the fortunes of central Nevada took a turn for the better. The stimulus offered by the wartime economy, which was made readily apparent in the Carson Sink by the establishment of a naval air base near Fallon, and the apparent resolution of conflicts over reclamation, combined to increase the economic security of the region. Livestock, dairying, and alfalfa became more profitable for growers in both the Carson Sink and the valley of the lower Humboldt, and land values increased, reflecting growing interest in farming. Mineral production, as well, continued to contribute to the economy, although new ores such as tungsten, iron, perlite, and diatomite reflected different interests in the minerals of central Nevada (Townley 1977:133; Hulse 1978: 202). Most prominent of all among recent developments in the lands of the study area was the role of government-sponsored or government-regulated projects. The establishment and maintenance of refuges for wildlife, the founding and use of the naval air station, and the controversy surrounding the utilization of waters from the Truckee-Carson system all depended on the involvement of the federal government in central Nevada. Local residents profited handsomely from the intervention, on the one hand, while on the other, they became tired of what came to be seen as interference by distant interests in the life of the inhabitants of the study area.

I. The Naval Air Station at Fallon, 1942-1979

The United States Navy became increasingly interested in the lands of Nevada during the 1930s. Much of the unoccupied land seemed to be ideal for the storage of ammunition and the training bases that military fliers needed. In 1930 the Navy established an ammunition dump near Hawthorne, making their first inroads in the state. Twelve years later, the military began a base at Fallon in the study area. The activities of the Navy were supported by Patrick A. McCarran, the defense- and aviation minded United States Senator from Nevada during this period. Acutely aware of the need for economic development in his home state, McCarran pushed for the establishment of Air Force bases near Reno and Las Vegas, as well as the Naval Air Training Station at Fallon (Hulse 1974:222; McCarran 1969:42-43).

The station at Fallon began as an Army Air Force Base in June 1942, with an outlay of \$464,000. The next year, it was converted to a Naval Auxiliary Air Station. As a result of the demands of the Pacific Theater in World War II, the Navy needed training facilities for its pilots. More than on the east coast, Nevada offered good flying weather and greater proximity to the Pacific Theater of the war, and the open spaces of the state gave fliers plenty of room for maneuvers and target practice. The base at Fallon served as an adjunct to the larger, more important air station at

Alameda, California, providing a secondary landing field as well as a training facility. Under the leadership of Commander Albert F. Rice, the base began to train recruits, and was commissioned on June 10, 1944 (de Braga 1964:66; Regan personal communication, 1979; Filson n.d.:7-8).

Initially, the air base featured three runways in the southern part of the Carson Sink, and employed between 250 and 400 civilian workers, many of them from the local community, in both construction and maintenance. Although the base at first was only designed for one thousand trainees, the urgent wartime situation soon convinced the Navy to send groups of two thousand to the base (Filson n.d.:7-8). These men at first overflowed into any housing available in the area, including the old, rundown buildings of the Nevada Colony Corporation. But barracks were soon built to house all the trainees. During the war, the base was made up of:

"...two wood-frame hangars, a synthetic trainer building, barracks for 2000 men, and a dispensary. Temporary emergency personnel capacity at Fallon was 4,200. There was gasoline storage for 200,000 gallons" (United States Department of the Navy, Bureau of Yards and Docks 1947:238-239).

Despite this overcrowding and rapid growth, however, the base gradually fell into disuse after the war. The station was decommissioned in late 1946, although the Navy held on to the lands as a reserve. It saw some use in an emergency hay airlift in the cold winter of 1949, but most of the functions of the base had ceased with the end of the Second World War (Filson n.d.:9; de Braga 1964:66,68).

With the outbreak of the Korean War in 1951, activities resumed at the base, and in 1953 it was officially recommissioned as an Auxiliary Air Station, still an adjunct of Alameda Naval Air Station on San Francisco Bay. Much to the benefit of the economy of the Carson Sink, the Navy spent more than \$5 million in renovating and expanding the air base, including the construction of new facilities and the acquisition of additional lands. By 1957, under the command of Captain Harry E. Fitzgerald, the base reached full force, and continued to expand. By 1959, the station itself covered twelve square miles and housed 33 officers and 498 enlisted men. The base's total of 1346 aircraft made an average of 330 landings and takeoffs daily. New targets and ranges had also been established, and in 1960 a new 14,000 foot runway was completed. Most local residents welcomed the return of the base; it created jobs in the vicinity, and worked hard to maintain good public relations, in part through the means of an annual open house and air show (Filson n.d.:9-11,15-16; de Braga 1964:68-71).

The continued existence of the air station contributed to the prosperity of the local economy during the 1960s and the 1970s. At present, the station adds \$17 million to the local economy directly, in addition to military-related jobs. In 1979, the permanent population on the base approximated 700 members of the Navy, with another 260 civilians working there. In addition to permanent staff and civilian employees, the base receives an influx of 500-1400 trainees every two weeks. The training

facility can handle up to a complete carrier wing, or eight squadrons. The base proper occupies 7664 acres, although 3884 of them are leased to local ranchers. Another 142,000 acres in central Nevada are devoted to ranges B-16 through B-20, with none of that land leased out. Another target, the Electronic Warfare Range, covers another 25,000 acres, and some local ranchers receive grazing permits to use it. The B-20 range, 32 miles north by northeast from the base, comprises 32 sections of public lands and 32 sections of Southern Pacific Railroad lands in the most forbidding regions of the Carson Desert. It has been used since the early 1940s for bombing practice and live ordinance jettisoning. Because of the possible dangers of live ammunition, it is swept and cleared at least once every year (Regan, personal communication, 1979).

II. Wildlife Management and Refuge, 1931 to Present

Although the Carson Sink contains extensive areas of unbearable desert, it also includes many square miles of marsh lands rich in natural wildlife. The federal government first recognized the values of these lands to the environment when it established, by executive order, the Fallon National Wildlife Refuge on April 22, 1931. This shelter comprises 28 square miles on Bureau of Reclamation lands, and is located just to the north of Fallon. It protects waterfowl, pheasants, and California quail (USDI/BR 1942: 91; Butcher 1963:321; United States Department of the Interior, United States Fish and Wildlife Service 1976:A-7).

A larger, more ambitious wildlife project was undertaken in 1948 with the establishment of the Stillwater National Wildlife Management Area and Refuge, to the east of Fallon. The marsh around Stillwater had always enjoyed a reputation as a good site for duck hunting. In 1948, the Truckee-Carson Irrigation District and the Nevada Department of Fish and Game agreed to set aside 24,200 acres for a refuge and another 200,000 for wildlife management. The area lies along the route of the Pacific Flyway, where migratory fowl make seasonal journeys to the north and south. In particular, the refuge protects whistling swans, geese, ducks, herons, shorebirds, and muskrats. Facilities in the area were gradually established for camping, boating, and picnicking. In addition to the refuge, the wildlife management area tried to restore the marsh and offer some hunting and fishing, as well as grazing. Managed by the Nevada Game Commission and the Truckee-Carson Irrigation District, rather than the United States Fish and Wildlife Service, the management area was once one of the biggest duck hunting preserves in the country. The number of birds seemed to peak in the late 1950s and species of fowl have seemed to decline recently. A severe drought at the very end of the 1950s forced migratory birds to alter their path, and liberal hunting regulations in the Southwest have contributed to the depletion of fowl along the Pacific Flyway (Wiseman n.d.:1-3,5-6,9-11; Butcher 1958:321; de Braga 1964:31-32; Laycock 1973:232; Townley 1977:13; Regan, personal communication, 1979).

III. Conflicts over Water Rights and Usage, 1955-Present

Ever since the mid-1950s, the rights of water users in the Truckee-Carson Irrigation District (TCID) have been challenged from several quarters. The state of California, the federal government, and the Pyramid Lake Indians have all made claims on water from the Truckee and Carson river systems. The first series of difficulties arose in the mid-fifties between the states of California and Nevada. In an effort to maximize water usage and distribute water resources fairly, a bi-state commission was established to negotiate over the issues. After prolonged disagreements and fact-finding projects, the two states had reached accord in 1970, and were set to sign an agreement, when the federal government intervened in defense of the Pyramid Lake Indians who claimed that their rights to water from the Truckee River had been violated at the outset of the entire reclamation project around the beginning of the century. The claims of the Pyramid Lake tribe, backed by the Bureau of Indian Affairs, set up several ironic conflicts. First, within the Department of the Interior, the two bureaus of Indian Affairs and Reclamation were in opposition to each other; second, the Pyramid Lake Indians came into conflict with Indians in the Carson Sink who had settled on lands of the Newlands project; third, the agreement reached between California and Nevada temporarily fell by the wayside as new issues entered into the discussion; and finally, the managers of the wildlife reservations in the Carson Sink became concerned and started to contend that any reduction of the flow of water into the sink would jeopardize the wildlife habitat (Townley 1977:chps. 15 and 16).

Slowly, the issues came to be negotiated and, in some instances, resolved, but many have not been resolved, and some of the issues have been blown out of proportion. At one point, it appeared to residents in Lahontan Valley that the government intended to buy them all out in order to return the water to Pyramid Lake, in an effort to stabilize that shrinking body of water. Since that time, the Indians have lost ground in their fight, and the ranchers and farmers of the Carson Sink and Lahontan Valley have felt relief in that aspect of the challenges. However, suits are still pending in this matter, and one doubts that it will soon be resolved. During the heat of the argument, the Truckee-Carson Irrigation District disobeyed federal commands about how much water it could allow to run into the lands of the Newlands Project, and the Department of the Interior threatened to void its contract with TCID and take over the project once again. This matter, too, was taken to court, for the federal agency had pursued it in the interests of the Pyramid Lake Tribe. In any case, the threat of federal recapture of the program was quelled. In the end, much of the battles came to be reduced to publicity and maneuvering. The TCID seemed to be weaker in its "publicity battle" at first, but it has since taken effective measures to conserve water on project lands, partly in an effort to prove that irrigation is the most efficient use of the water. The Indians, on the other hand, have become increasingly powerful recently, and have made a strong case in their favor. One of their contentions -- that the tribe's interests had not been adequately represented and considered when key decisions about water usage were made -- has recently

been rejected in court, but a number of other arguments have yet to be considered (Townley 1977:144-145, 148-150).

The issues of water rights and usage make a fitting conclusion to the history of the lower Humboldt River valley and the Carson Sink. Initial reactions to the lands seemed largely negative. It seems ironic and tragic that the lands and resources of the area, so little regarded before, have come to be the crux of current controversies. Moreover, it seems logical that the Indians of Nevada, dispossessed by white emigrants and settlers in the mid-nineteenth century at the beginning of this history, have come to protest that continued dispossession at the end. Whites, who initially found the land so harsh and inhospitable, have remade the ecology in their own image and have made it home, but only after protracted struggle and repeated heartbreak with the Truckee-Carson project and agriculture. On the surface, the increased role of government in the area in the twentieth century would seem to offer hope that, using the agencies of government as mediators and means of reconciling opposed interests, the parties to the conflict would be able to reach some harmonious conclusion. Now that the government itself has become divided over the issues, and that recent attitudes toward the federal government in the Far West have soured, that avenue of resolution seems to have less potential for a satisfactory conclusion. In a country that remains concerned with agrarian values and reclamation of arid lands, but has become more recently concerned with issues of dispossessed minorities, environmental blight, and the role of government in everyday life, controversies like these over lands and water usage in the study area bring into conflict a wide range of accepted values, and offer no signs of prompt and easy settlement.

Figure 5

HISTORIC SITES IN VICINITY OF LOWER HUMBOLDT RIVER VALLEY AND CARSON SINK

- | | |
|--|---|
| 1. Trinity | 19. Salt Wells |
| 2. White Plains | 20. Humboldt Ranch of Nevada Colony Corporation |
| 3. Brown's Station | 21. Humboldt Slough Emigrant Crossing |
| 4. B-20 Range | 22. Huxley Station |
| 5. Coppereid | 23. Salinas Post Office, 1880-1882 |
| 6. Cox Canyon | 24. Kodak |
| 7. Desert Crystal Salt Works, Huxley plant | 25. St. Clair |
| 8. Desert Crystal Salt Works, White Plains plant | 26. Limestone Kiln, Huxley |
| 9. Desert Quartz Mill | 27. Miriam |
| 10. Desert Queen Mine | 28. Natural Drain in Humboldt Dike, Murphy's Station, Oneida Mill |
| 11. Desert Wells | 29. Nevada City, Nevada Colony Corporation socialist community |
| 12. Double Wells | 30. Pallen's Wells |
| 13. Sink Station | 31. Parran Station, Kinney Saline Deposit Salt Works |
| 14. Soda Lakes | 32. Ragtown |
| 15. Fallon National Wildlife Refuge | 33. Stillwater |
| 16. Fallon Naval Auxiliary Air Station | 34. Stillwater National Wildlife Refuge |
| 17. Fallon Sugar Beet Factory | 35. Stillwater Wildlife Management Area |
| 18. Hill | |

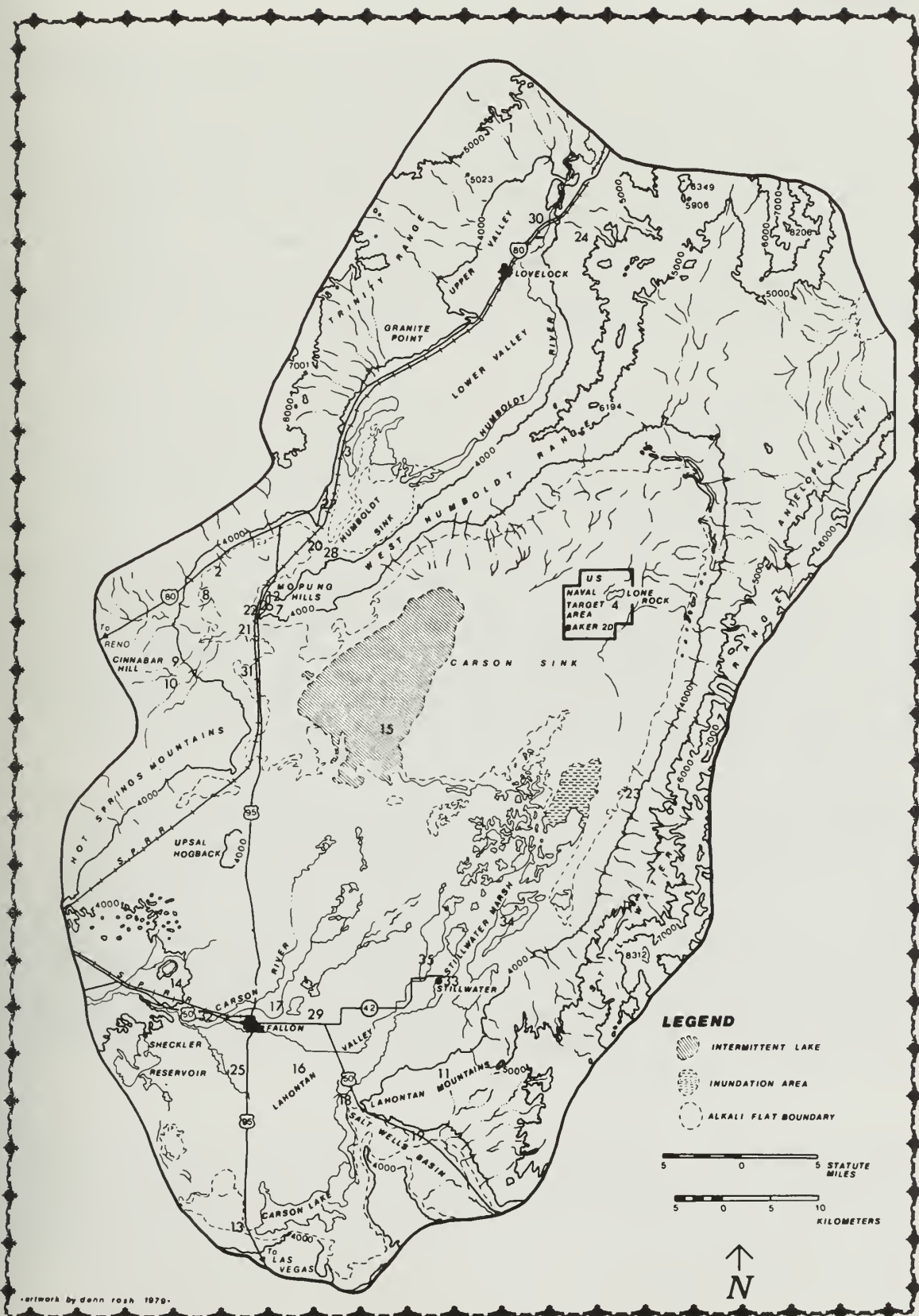


Figure 5

ETHNOGRAPHIC OVERVIEW

Introduction

This ethnographic overview of the study area is intended to meet three prime objectives. The first of these is to provide an ethnographic overview for archaeological interpretation. The detailed information available in the historical and ethnographic literature can provide archaeological researchers with an important data base for interpretive purposes. It has been argued that for archaeological purposes ethnographic information should be used as a theoretical model against which to test archaeological data (cf. Thomas 1973; Bettinger 1975). Therefore, this summary is intended to provide a basis for such model testing in terms of verifying or rectifying existing archaeological hypotheses, forming new 'testable' hypotheses and providing a framework within which archaeological interpretations can be placed, although Wobst (1978) has recently issued a warning on the pitfalls of "Archaeo-Ethnology."

The second objective is to identify from both literature and archival sources the aboriginal groups, their territorial boundaries, their linguistic affiliations and their demographic structure during precontact times.

The third major objective is to provide a reasonably comprehensive bibliography on the Native Americans resident in the study area prior to 1850-1870.

A select number of social and economic features are discussed in detail with regard for their relevance to the archaeological record. Subsistence patterns are discussed in some detail as are environmental features related to these practices. Social organization, mythology and shamanistic practices/beliefs among other areas are treated generally as they are in the existing literature. Material culture and other institutions peculiar to or affecting the various groups such as intertribal trade, warfare, etc. are included where reliable information exists.

A caution is in order before proceeding. The ethnographic record as collected by various anthropologists and interested observers during the past 100 years is biased and should be interpreted with some care (for a history of Great Basin ethnography cf. Baumhoff 1958 and C. Fowler 1977). That is to say, the information used to compile the recent ethnographic record was obtained from individuals who were either very young at the time of Anglo contact or who had obtained their information second-hand through interaction with older individuals (cf. Steward 1936 for an example). In either case, memory-loss, acculturation and lack of first-hand knowledge/experience may have contributed to a notable bias in the data available to the anthropologist. The ethnographic record can be and is a valuable data base if these reservations are kept firmly in mind (cf. Wobst 1978).

Aboriginal Groups Resident in the Region

The research conducted by Omer Stewart in the mid-1930s in conjunction with the University of California, Berkeley's cultural element survey led him to divide the Northern Paiute into twenty-one distinct, separate bands (Stewart 1939; Fig. 6, this report). A number of scholars (e.g., Julian Stewart 1955, 1970; Stewart and Wheeler-Voeglin 1974; Park 1938a) have taken Stewart to task for his band designations as they feel that while there was a sense of identity among the Northern Paiute there was no band organization as suggested by Stewart (1939), Service (1962) and others. As well, criticism has been directed to his failure to distinguish native local food-named groups¹ from the fluid post-white "bands" under the various chiefs recognized by the whites (cf. Stewart and Wheeler-Voeglin 1974:72-79).

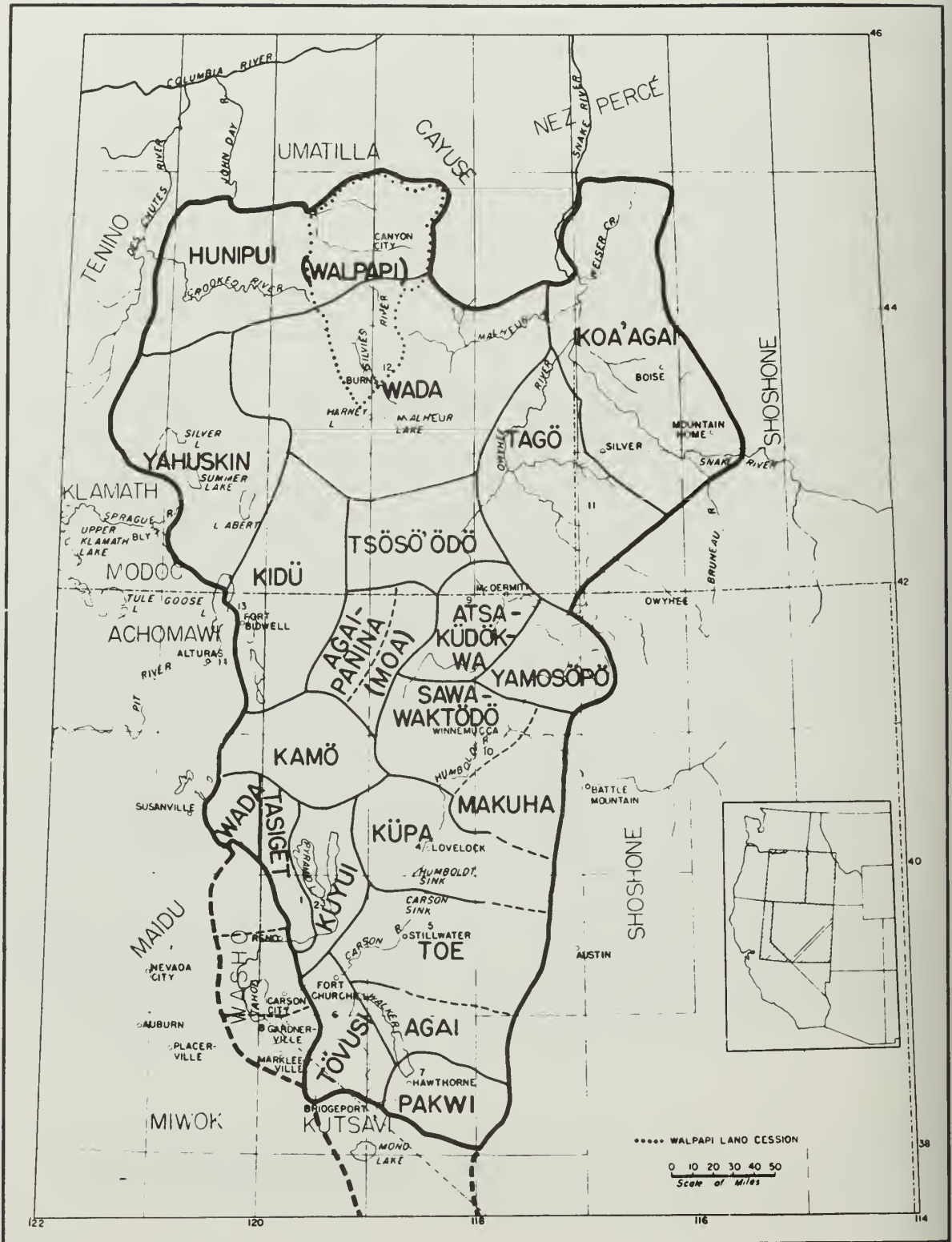
The data presented by the two opposing views are to a degree contradictory and confused (cf. Stewart 1955, 1970; Stewart and Wheeler-Voeglin 1974; Stewart 1939, 1941, 1966) due in part to the lack of precise ethnographic data and reliable ethnohistorical accounts. However, in spite of the arguments advanced by Stewart (1955, 1970) and others, it does appear that Stewart's band concept has some validity. Informant information and archival research have presented data that apparently does recognize the differentiation of a number of separate bands.

"The basic unity of the Northern Paiute appears from the fact that they pictured exact boundaries dividing themselves from surrounding tribes, whereas interband divisions were often vague and indefinite. Map 1 shows bands sharply separated; yet these lines were not always conceived so precisely. Band territories consisted of a relatively productive area and its environs; . . .

Further indication of the close band relationships is found in the number of distinct group names and the number of different local chiefs remembered by certain informants. . . . In fact, nearly all informants knew the names of several bands and their leaders, as well as the boundaries dividing their territories, thus providing a check for all information (Stewart 1939:130)."

For the purpose of this report Stewart's (1939) band divisions are accepted as essentially valid and our discussion of the groups for the study region will utilize his data in spite of several valid criticisms of the research and interpretations used to derive the divisions (cf. Stewart 1955, 1970; Stewart and Voeglin 1974; Park 1938a).

¹ The band names used by Stewart (1939) are thought to be local food names which designated individuals living in various food-named areas (e.g., ground squirrel eaters, etc.). When a person moved elsewhere he acquired the food-name of his new locality.



(From Stewart 1939:Map 1)

Figure 6: Northern Paiute Bands

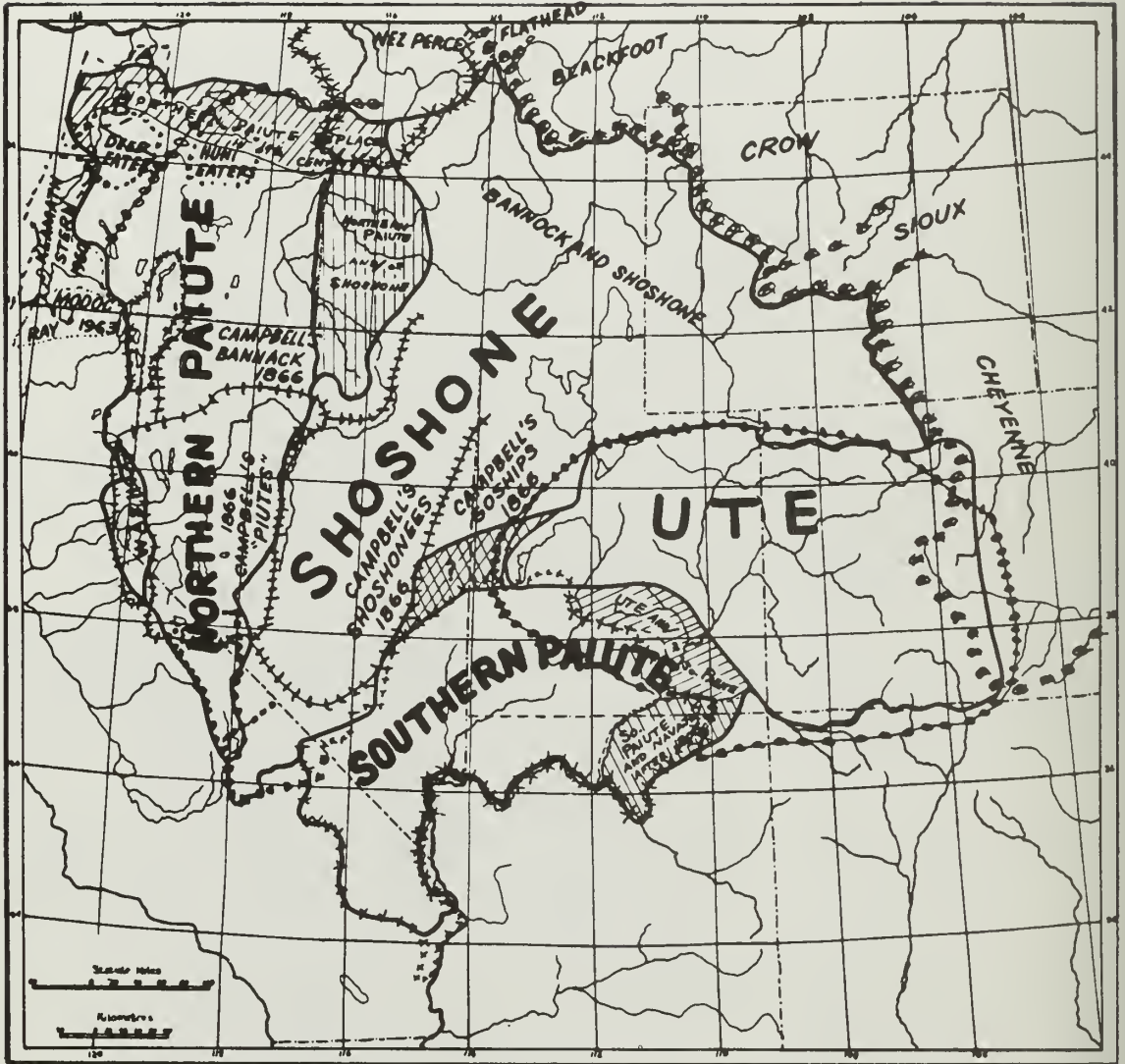
The study region is contained within the overall territory of the group designated as the Northern Paiute (Stewart 1939) or Paviotso (Park 1938; cf. Stewart 1939:129, Note 20). Occupying portions of northwestern Nevada, southwestern Idaho, southeastern Oregon and eastern California, the Northern Paiute have formerly been known as Oregon Snakes, Western Bannock, Northern Paiute and Paviotso (Stewart 1939:128) (Fig. 7). The word Paiute (Pah Ute, Piute + several other variations), as used for the Native Americans of west central Nevada, has been explained as a combination of the Paiute words pa (water) and ute (direction) (Stewart 1939:128). Powell (cited in Fowler and Fowler (ed.) 1970) believed that the name was composed of the syllable Pai (true) and Ute (meaning "true Utes"). Powers (Fowler and Fowler (ed.) 1970) also noted that from information gathered in Nevada, the word was derived from pah (water) and Ute and meant "The Water Utes" a not too unlikely conclusion considering the Paiutes adaptation to a lacustrine/desert subsistence base. Stewart (1939:123) notes that travellers may have used the term Ute to name this Shoshone group but differentiated the Northern Paiute from the true Ute by the addition of the suffix 'pa' (cf. Stewart 1939: 128-129 for an extended discussion of the term and its diverse origins). The Paiute call themselves nömö (people).

Neighboring Native American groups are illustrated in Fig. 8 . Murdock and O'Leary (1975) and C. Fowler (1970) should be consulted for a listing of relevant ethnographic materials pertaining to both the Northern Paiute and other Great Basin groups.

The definition and delineation of the Northern Paiute territorial boundaries has been subject to various problems and controversy (cf. Stewart 1937, 1955, 1970; Park 1938a; Stewart 1939, 1966; Stewart and Wheeler-Voeglin 1974). Omer Stewart, in his research for the Indian Land Claims Commission, has presented an excellent synthesis of both published and unpublished materials pertaining to the tribal "boundaries" of several western North American groups - among them the Northern Paiute. While his work has been subjected to some detailed criticism, especially in regards to his band boundaries (cf. Stewart 1955, 1970; Stewart and Wheeler-Voeglin 1974; d'Azevedo 1966), his research can be considered as essentially valid for the purposes of this overview. Stewart (1966) cautions on the use of "fixed, legal" boundaries as strict tribal territorial definitions. While boundaries did exist to some degree, they were apparently fluid and 'variable' between adjacent tribal groups and bands (cf. Stewart 1939). (Fig. 9)

The "Findings of Fact" by the Indian Land Claims Commission (1959) have described the Northern Paiute tribal lands as follows:

20. The Commission finds that in aboriginal times the Northern Paiute Indians did not have any overall political organization. They were never recognized, designated or dealt with by government officials as a tribal land holding entity or nation. The Northern Paiutes did not collectively occupy and use the entire Northern Paiute territory but rather grouped into certain main divisions, within which localized family groups or bands were free to roam over a large area, staying, however, within certain defined limits. The Northern Paiute Nation did not hold Indian title to any portion of claimed territory.



LINGUISTIC BOUNDARIES BY OMER C. STEWART — 1964

(From Stewart 1966)

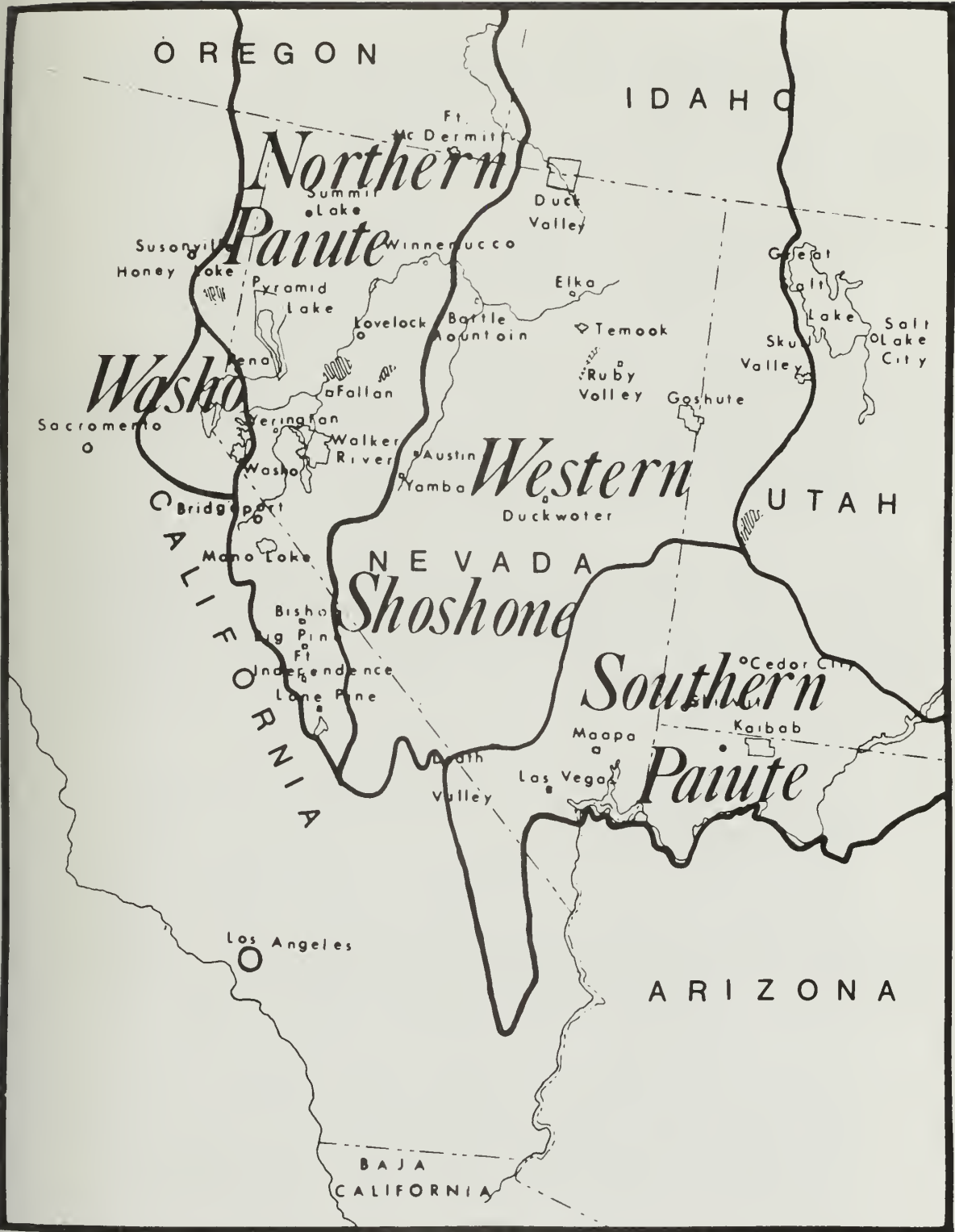
LEGEND

- Linguistic Boundaries by Omer C. Stewart 1964
- +++++ Campbell 1866 (Nevada Indians)
- ▣▣▣▣ Rayce 1899 (Treaty Lines)
- Jacobs 1931 (Sahaptin)
- ××××× Kelly 1932 (Surprise Valley Paiute)
- XXXXXX Kelly 1934 (Southern Paiute)
- Steward 1933 (Owen's Valley Paiute)
- ■ ■ ■ Kraeber 1933 (Panamint Shoshone)
- ● ● ● Coake 1938 (Ute)
- Murdock 1938 (Paiute - Tenina, "A" & "B")
- Blyth 1938 (Northern Paiute Bands)
- × × × × Ray 1962 (Nez Perce)
- Ray 1963 (Modoc)
- - - - Stern 1960 (Klamath)

MAP 8

Tribal boundaries according to thirteen authors.

Figure 7



(From Johnson 1975)

Figure 8

21. The Commission finds that there was in the southern portion of the claimed territory an area (referred to in detail in our Finding 13) which had been exclusively occupied and used in Indian fashion from time immemorial by the bands or groups of Northern Paiute Indians who were then generally referred to as the Monos or Piutes of Owens Valley, which area is described as follows:

Commencing at the present town of Olancho, California, (south of Owens Lake), thence to a point about 4 miles east of the present town of Keeler, California, thence north to the crest of the Inyo Mountains and continuing north, northwest along the crest of the Inyo Mountains to a point at 36°50'N latitude, 118°00' W longitude, thence north, northeast to the present town of Oasis, California, thence north to the present town of Coaldale, Nevada, thence west, northwest to the summit of Potatoe Peak, thence southwest to the summit of Dunderberg Peak, thence southeast to the summit of Mt. Morgan, thence southeast to the commencing point at the present city of Olancho.

22. The Commission further finds that there was an area largely in Nevada, with small areas in California (referred to in detail in our Finding 14) which had been exclusively occupied and used in Indian fashion from time immemorial by the bands or groups of Northern Paiute Indians in Nevada who were aboriginally known as Paviotso or Paiute of western Nevada, which area is described as follows:

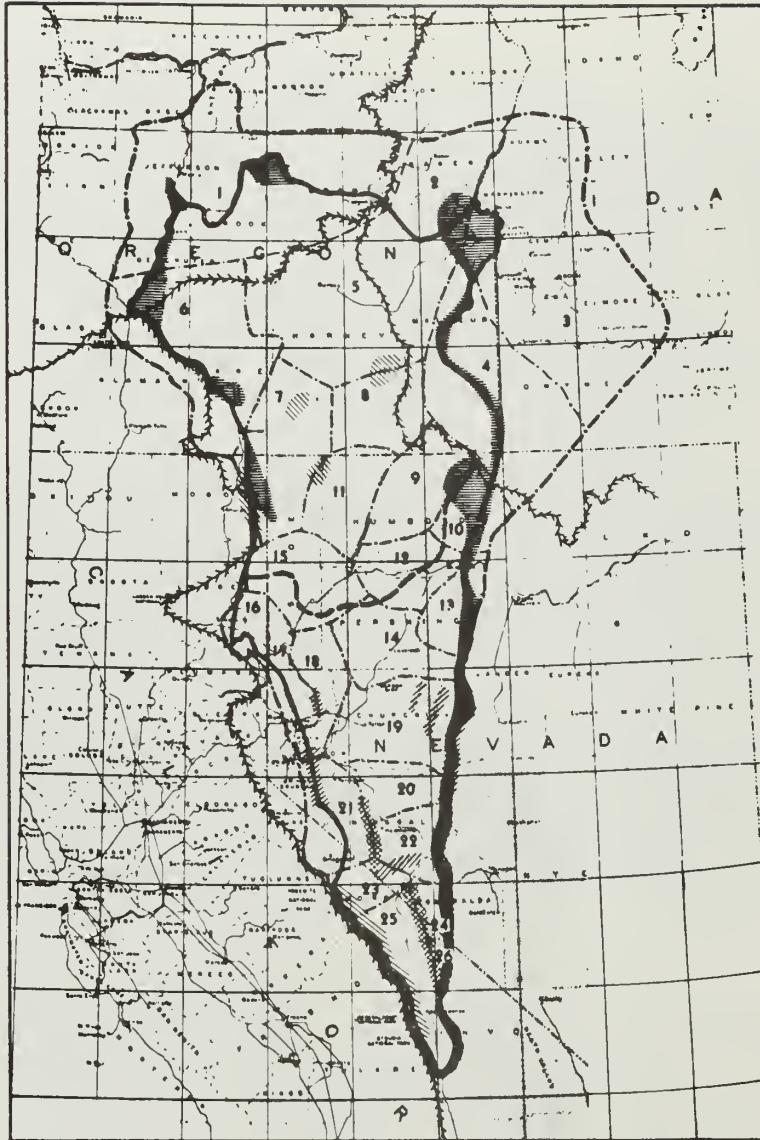
Commencing at Pilot Peak, approximately 7 miles east of the present town of Sodaville, Nevada, thence north, northeast to the crest of the Paradise Range of mountains and continuing north along the crest of the Paradise Range, thence north, northeast to the crest of the Destoya Mountains and continuing northeast along the crest of the Destoya Mountains to the 117°30' W longitudinal line, thence north to the summit of Mt. Tobin, thence north, northwest to the summit of Sonoma Peak, thence northwest to the present town of Winnemucca, Nevada, thence west, southwest to the present town of Gerlach, Nevada, thence west to a point at an elevation of about 6400 feet about 7 miles north, northwest of the present town of Karlo, California, thence south to the northwest edge of Honey Lake, thence east, northeast along the northern shore of Honey Lake and continuing south along the eastern shore of Honey Lake to the southeast tip of Honey Lake, thence southeast to a point at 40°06' N latitude, 119°52' W longitude, thence south, southeast along a line to the present town of Silver City, Nevada, to the point where said line intersects with the summit of the Virginia Range at latitude thirty-

nine degrees twenty-eight and one-quarter minutes North (Lat. $39^{\circ} 28\text{-}1/4''$ North), thence along said summit in a southerly direction to the point where said summit again intersects the aforesaid line at latitude thirty-nine degrees twenty and two-tenths minutes North (Lat. $39^{\circ}20.2''$ North), thence southerly along said line to the present town of Silver City, Nevada, thence southeast to the summit of Lyon Peak, thence south, southwesterly along the summit of the Pine Nut Mountains to the summit of Mt. Siegal, thence south, southwest to the summit of Sonora Peak, thence southeast to the summit of Potato Peak, thence east, northeast to the commencing point at Pilot Peak.

23. The Commission further finds that there was an area in north western Nevada and southeastern Oregon with a small portion in northeastern California (referred to in detail in our Finding 16) which had been exclusively occupied and used in Indian fashion from time immemorial by bands or groups of Indians who were aboriginally known as Snakes, Digger Snakes or Paiutes, but who are now known as Northern Paiutes. Included among these bands or groups of so-called "Snakes" were certain bands who had, in aboriginal times, developed into land using groups separate and apart from the other "Snake" Indians. These bands were the Walpapi, the Yahooskin, and the Snake or Paiute Indians of the former Malheur Reservation in southeast Oregon who were parties to an unratified treaty of December 10, 1868. These Indians and their claimed territory are specifically removed from this action for reasons previously detailed in our findings. The remaining bands or groups of these "Snake" or Paiute Indians exclusively occupied and used the territory described as follows:

Commencing at the present town of Fairport, California, on the east shore of Goose Lake, thence south, southeast to the summit of Eagle Peak, thence southeast to the southernmost tip of Lower Lake, thence east, northeast to the summit of Pahute Peak, south of Summit Lake, thence east, northeast to the summit of Santa Rosa Peak, thence north, northeast to the present town of Jordan Valley, Oregon, thence north along the Oregon-Idaho border to the $43^{\circ}30''$ N parallel, thence northwest to the summit of Freezeout Mountain, thence southwest to a point at $42^{\circ}53''$ N latitude, 118° W longitude, thence west, southwest to the present town of Blitzen, Oregon, thence northwest to a point at $42^{\circ}58''$ N latitude, $119^{\circ}47''$ W longitude, thence south, southwest to the northeasternmost tip of Goose Lake, thence south along the eastern shore of Goose Lake to the starting point at Fairport, California. (Indian Claims Commission, Findings of Fact, Docket 87, March 24, 1959)

Of some interest in regards to the Northern Paiute bands is Kroeber's (1957) reassessment of the intergroup Q_2 correlation coefficient for eleven



(From Stewart 1966)

Indian Claims Commission Docket 87 THE NORTHERN PAIUTE NATION, Defendant's request for Findings of Fact, Objections, to Petitioner's requested Findings of Fact, and Brief Barnard M. Newburg, Attorney

LEGEND

- External Limits, Petitioner's Claim
- o i Petitioner's "Bonds"
- Limits of Range of Northern Paiutes, According to Defendant
- ▨ Zones of Blending, or Multiple Use
- Drainage Divides
- ▨ Desert or Barren Areas
- Line Dividing High Arid Region from Internal Drainage Area
- ▨ Pine Nut Areas
- ▨ Antelope and Deer

MAP 17

Northern Paiute Territory according to government witnesses.

Figure 9

Northern Paiute bands from whom Stewart (1941) had interviewed for his Culture Element Distribution lists. The analysis for indicated degrees of interband similarity showed that the five northern bands (Sawawa, Atsa, Tago, Wado, Kidu) are more similar to each other than to the seven southern bands (Kupa, Toe, Pakwi, Tovusi, Kuyui 1 and 2, Tasiget) which internally resemble each other (cf. Fig. 6, this report). Kroeber (1957) noted that he was aware of "no specific ecological, historical or linguistic reasons for the boundary, but its existence seems undeniable." Supporting evidence is presented in Park's research (1938a) who noted that the southern bands (included among his Paviotso group) regarded themselves as a distinct group. ". . . the Paviotso of Nevada regarded themselves as an entirely distinct group. This attitude may be regarded as an incipient feeling of nationality (Park 1938a:624)."

Heizer (1967:6-10) has suggested that the difference between the northern and southern groups revolves around an ecological factor - the presence/absence of suitable lakes for subsistence exploitation and the resultant effects on the internal culture of the individual bands. Further research and analysis may support or invalidate the hypothesis suggested by Heizer (1967) based on his interpretation of Kroeber's (1957) analysis.

Bands Present in the Study Area

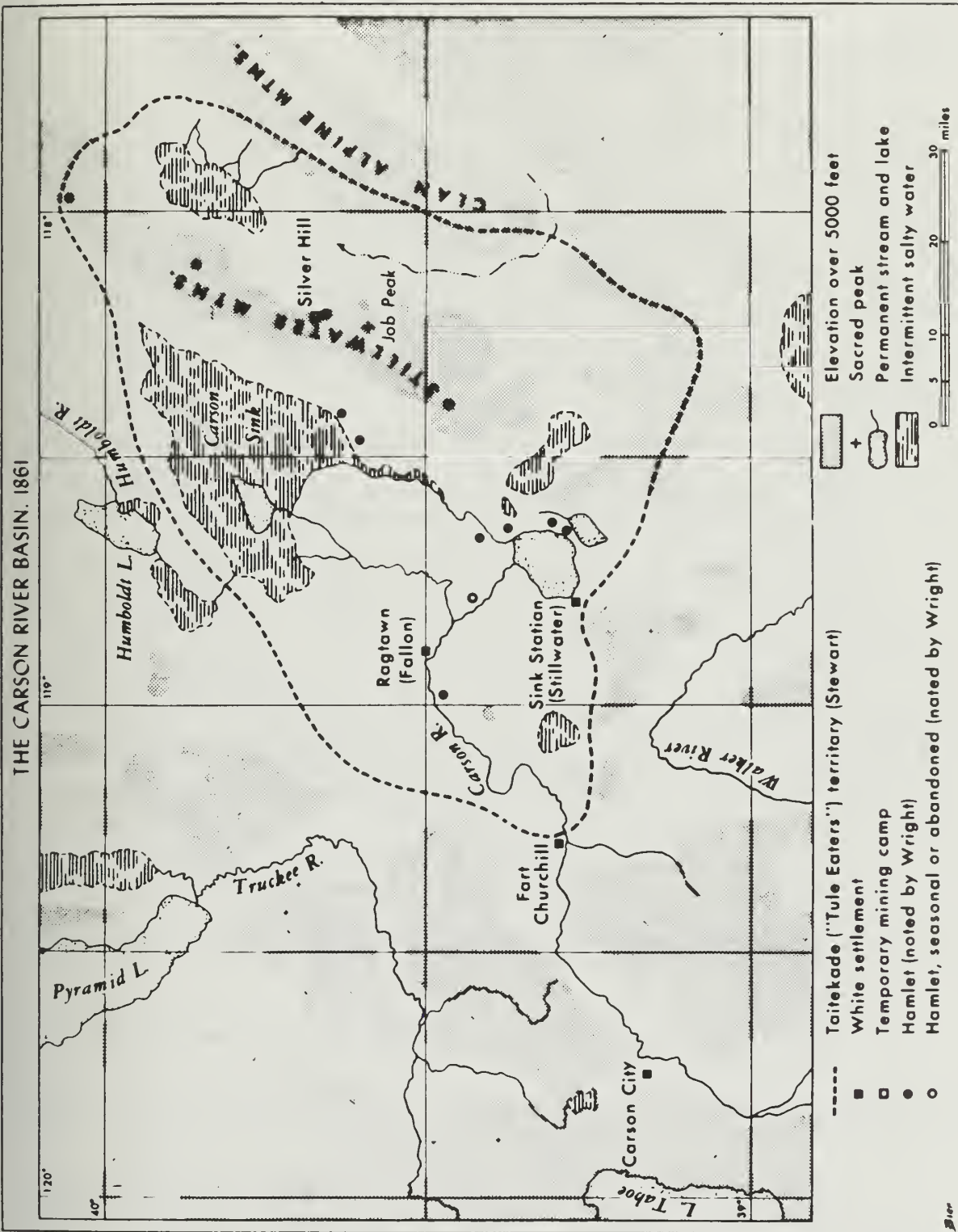
Stewart (1939:Map I, Fig. 6, this report) assigned the Kupadokado ("ground squirrel eaters") and the Toedokado ("tule (or rush) eaters") to the study region (cf. Fig. 6).

The Kupadokado territory covered approximately 3600 square miles and ran from the Shoshone-Paiute boundary (Figs.6-9) at the Desatoya Mountains on the east to the Nightingale and Selenite Mountains; the Kuyui border, on the west; and from the Pahsupp, Kuma and Majuba mountains on the north, to the Humboldt and Hot Springs Mountains on the south. The center of habitation was undoubtedly the lower Humboldt River and the Humboldt Sink marshes (Stewart 1939:140-141). The KepA-tekade band ("squirrel eaters") (Loud and Harrington 1929:153) is noted by Stewart (1939:139) as having occupied the Humboldt Sink but as Stewart and Wheeler-Voeglin (1974:91) have pointed out, this group was definitely located in Granite Springs Valley outside the study region (Fig. 2). Other sources discussing the aboriginal inhabitants of the Humboldt Sink include Schoolcraft (1851:5-201) who noted that a band "near the sink of the Humboldt, under Chief Te-me-re-wena (the long man) numbered 600." Stewart (1939) could not confirm this statement during his research. Indian Agent Campbell in 1866 listed five "Pi-Ute" "bands" in Nevada including the Sidowcaw of Humboldt Lake and River. This band had a population of 800 and was under the leadership of "Chief Sue" or "Captain Soo" (Campbell 1866:119). Bancroft (1890:208) notes a "Captain Soo" or "Mog-uan-no-ga" (cf. Angel 1881:150) as a participant in the Pyramid Lake War of 1860 (cf. Historical Overview, this report). Old Winnemucca, Captain John (Samaranido - "patting raw meat") and Tsikwunodo were named as Kupa chiefs ca. 1860 (Stewart 1939:139). Of passing interest is the fact that the Kupa were one of the first Native American groups in western Nevada to feel the impact of the Anglo explorers when Walker's exploration party of 1833-1834 slaughtered over 20 aborigines in the Humboldt Meadows near the sink (cf. Napton 1970; Historical Overview, this report).

The Toedokado group of Stillwater was widely known among the Northern Paiute bands quite possibly due to their proximity to Job's Peak, the mythical center of the Northern Paiute nation creation (Fig. 10 , cf. Mythology section this report). Their eastern boundary was with the Shoshone and the West Humboldt Range separated them from the Kupa on the north. The Desert Mountains divided them from the Aga'idokado of the Walker River area. The western boundary of this group could not be determined by Stewart (1939) due to the presence of Fort Churchill and its effect on the mixing of various bands in this vicinity. Stewart (1939:141) assigns a territory of ca. 6700 square miles to the group with a population of 800 individuals during pre-contact times.

A number of other sources also refer to the Toedokado group. Indian Agent Dodge assigned the sinks and lakes of the Carson and Walker Rivers to the bands of O-duk-i-o, Pe-tod-se-da and To-sarke with a combined population of 1625. No territorial distinctions were made by Dodge (1859:741). Stewart (1939:141) notes that "Tosark" (Gray Head) was possibly the Toedokado chief with the others leaders of neighboring bands. Indian Agent Campbell noted the Toy-Pi-Ute as a band of 800 people under the control of a Chief Johnson living at lower Carson Lake in 1866 (Campbell 1866:119). The Handbook of American Indians (Hodge 1907:2:772) notes a number of other groups in addition to those mentioned above as occupying the Carson Sink area. Among these are the Kosipatuwiwagaiyu band ("muddy water place") of the Carson Sink (Hodge 1907:1:792; cf. Loud and Harrington (1929) who indicate that this is a village rather than a band); the Tupustikutteh of Carson River (Hodge 1907:2:920); and the Toiwait (Hodge 1907:2:772) of the Carson Sink. Other name variations are presented in Stewart (1939:141) and Steward and Wheeler-Voeglin (1974). Loud (Loud and Harrington 1929:153) lists the Toi-tekade ("cat-tail eaters") as the Indians of the Stillwater Slough while Kelly (1932:72) states that the Toitikadu ("cat-tail eaters") lived at Fallon and Yerington (cf. Steward and Wheeler-Voeglin 1974). Park (1938:622) notes that the Toi-tuked now live at Fallon and Stillwater but formerly lived along the Carson River. Park also notes the presence of a small band, the Kos'-patuked (ko-si'pa, the seed of a grass commonly found in that vicinity) who returned to a small lake east of Fallon (Carson Lake ?) on a yearly basis (Park 1938a:622). Steward and Wheeler-Voeglin (1974) and Stewart (1939) should be consulted for an extensive discussion on the various opinions regarding the confusion surrounding the tribal groupings and boundaries of the Carson Sink group(s).

In summary, two bands were present within the boundaries of the study area - the Kupadokado (Humboldt Sink) and the Toedokado (Carson Sink) during pre-contact and contact times. While territorial divisions or strict boundaries between these bands have been subject to some controversy, as well as the idea of a 'band' concept for the Great Basin Native American groups, it is apparent that some form of territorial identity did exist among the various Northern_Paiute groups. The controversy surrounding these boundaries/bands cannot be definitely resolved due to the poor ethnographic and ethnohistorical data base available for the region. Therefore, this overview will utilize the boundaries described and mapped in Stewart (1939) for any subsequent discussions on the aboriginal inhabitants of the region.



(From Shimkin and Reid 1970)

Figure 10

Ethnographic Groups - Linguistic Affiliation

Linguistic criteria, in conjunction with geographic distribution, has been the traditional method of ethnographic differentiation for historic Great Basin groups. One language family is present within the borders of the study region. Both the Toe and Kupa bands are part of the Uto-Aztecan language family (cf. Kroeber 1907, 1925; Lamb 1958, 1964; Miller 1966; Hopkins 1965; Goss 1968, 1977 among many others) (Fig.11).

The languages of the historic Great Basin were included by Kroeber (1907, 1925) in his classification of the Shoshonean languages which he divided into four branches - Pueblo, Kern River, Southern California and Plateau. The branch we are concerned with is the Plateau Shoshonean which included the languages of the Great Basin groups. Three subdivisions are recognized (Kroeber 1934):

- I. Ute-Chemehuevi (Ute, Southern Paiute, Chemehuevi, and Kawaiisu);
- II. Shoshoni-Comanche (All true Shoshoni, including the Wind River and Comanche east of the Rocky Mountains and Panamint of Koso);
- III. Mono-Bannock (Bannock, Northern Paiute or Paviotso and Mono).

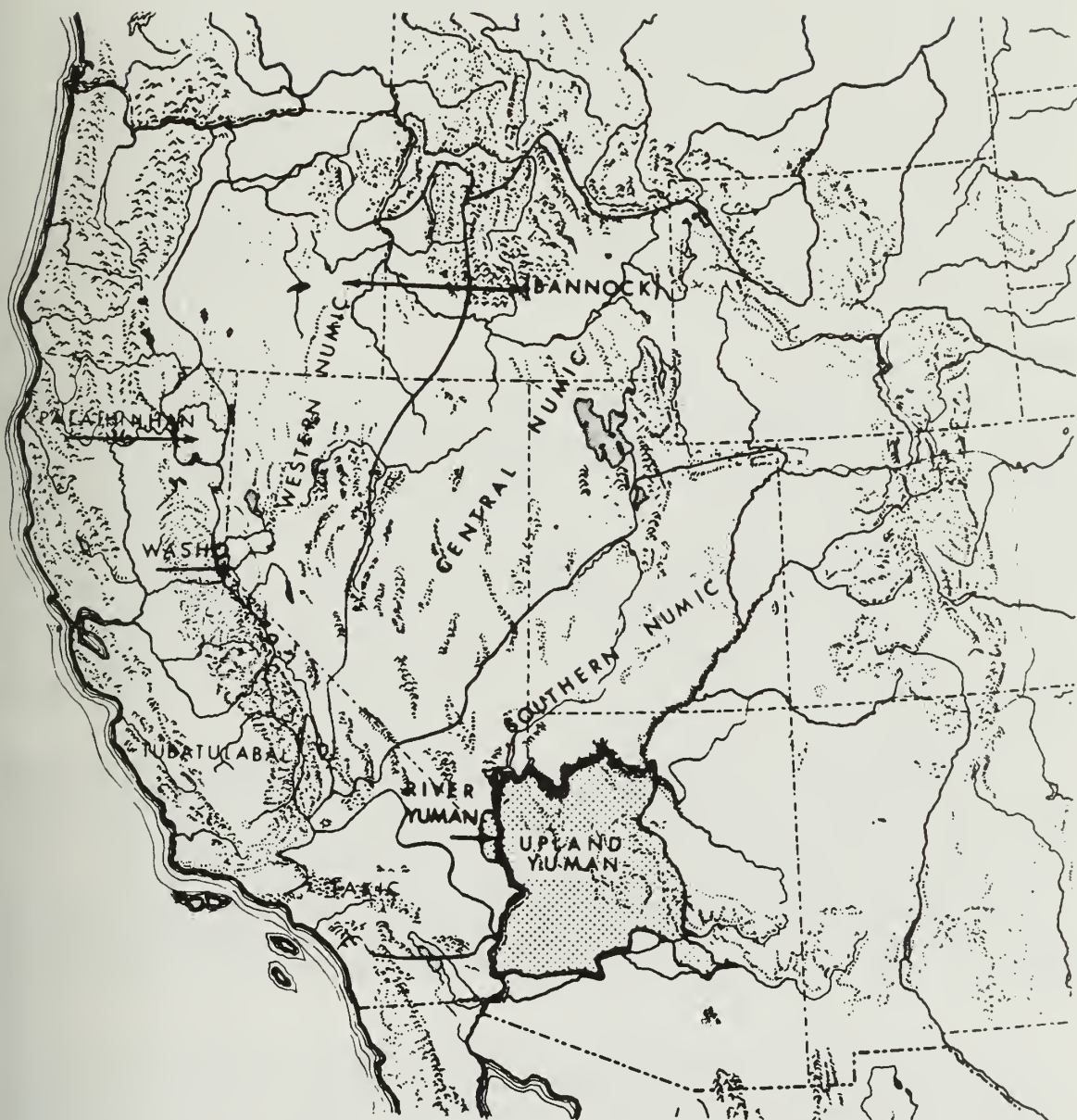
The ethnographic groups resident in the study area are included in subdivision III of Kroeber's classification scheme.

Lamb (1958) for a number of reasons, has proposed the family name of Numic for Kroeber's Plateau Shoshonean branch. He (Lamb 1958:96) agrees with Kroeber's (1907, 1925) conclusions considering Numic as a distinct genetic group and in dividing it into three branches. Lamb has proposed the following revised branch names which have been more or less adopted by linguists in the Great Basin.

1. Monachi-Paviotso: (a) Monachi: Owens Valley, California;
(b) Paviotso: the remainder of "Northern Paiute."
2. Panamint-Shoshoni: (a) Panamint: Shoshoni of southwestern Nevada;
(b) Shoshoni: Shoshoni of northern Nevada, Wyoming, Utah, Idaho and Comanche.
3. Kawaiisu-Ute: (a) Kawaiisu; (b) Ute: Ute, Southern Paiute and Chemehuevi.

The Northern Paiute groups of the study area fall within the Monachi-Paiute branch and within the Northern Paiute or Paviotso linguistic group.

The Northern Paiute speech is essentially homogeneous throughout its area - northwestern Nevada, a fragment of eastern California, southeastern Oregon and a portion of Idaho. Lamb (cf. Kroeber 1959) believes that this speech homogeneity over a large area indicates that the spread of "Northern Paiute" must be relatively recent (cf. Lamb 1958) perhaps on the order of the last thousand years.



(From C. Fowler 1970)

MAP 1: GREAT BASIN LINGUISTIC DISTRIBUTIONS

□ Uto-Aztecan □ Hoka

Figure 11

Several models have been formulated to explain Great Basin linguistic prehistory over the past 10,000 years. These studies have primarily involved proposing hypotheses to account for the protohistoric language distributions of the area as well as trying to account for some of the apparent disparities between the archaeological and linguistic records (cf. Fowler 1972; Goss 1968; Gunnerson 1962; Hopkins 1965; Lamb 1958; Miller 1966; Swadesh 1964; Swanson 1966; Taylor 1961, among many others). A review of the literature indicates that the present data is often in conflict (especially glottochronological and lexiostatistical material). It is possible that future detailed archaeological and linguistic research will provide material that may be of value in interpretation and reconstruction. The reader is referred to Goss (1977) for a current view of linguistic prehistory in the Great Basin (and the references therein).

Population - Aboriginal

Reliable demographic data on the central Nevada Paiute bands is sorely lacking. The population estimates for the aboriginal inhabitants of the Carson and Humboldt Sinks given by a number of sources, primarily Indian Agent reports and early exploration accounts, vary considerably for a number of reasons. Primary among these is the overestimation (and underestimation) of the native population due to lack of contact and the use of hearsay evidence in estimating population figures. Population estimates for the Kupadokado band between 1830 and 1870 range from Ogden's estimate of 200+ in 1829 (Fletcher 1929) to Leonard's 800-900 in 1833 (Leonard 1959) to Indian Agent Hurt's estimate in 1856 of 600 (Hurt 1859:364-365) to Indian Agent Campbell's 1866 enumeration of 800 (Campbell 1866:119), Indian Agent Dwight (1867:183) estimated 600 Kupadokado in 1867.

The Toedokado data is similarly unreliable. Indian Agent Hurt estimated 230 for the Carson River area in 1856 (Hurt 1859:228-229) while Indian Agent Dodge, 3 years later in 1859, totalled 1625 people (848 men, 372 women and 405 children) for both the Toedokado and Agai'idokado groups. In 1865, Indian Agent Campbell estimated a population of ca. 2300 for both the Toedokado and Kupadokado groups on the Upper Carson and Lower Carson Sinks (Campbell 1867:515). Campbell estimated 800 Toedokado in 1866 (Campbell 1866:119). Stewart (1939) has suggested a population of 800 per band for both the Kupa and Toe at the time of contact.

Total Northern Paiute population figures for Nevada apparently indicate a total population of 6000-7000 individuals for the period 1850-1860 although the estimates are far from reliable (cf. Hurt 1859; Wasson 1861). As Shimkin and Reid have pointed out (1970:Note 62) a very careful re-appraisal of the evidence on nineteenth century Indian populations in Nevada is required.

Reliable population densities are similarly difficult to estimate as they in turn utilize both 'unreliable' population and territorial data. The average density for the Great Basin was estimated by Kroeber (1934:3) to be 1 person for 15.6 square miles with which Steward (1938) concurs allowing for local environmental variation (e.g., the Owens Valley, one person to 2.1 square miles; the Humboldt River, one person to 3.3-5.2 square miles).

Utilizing the figures presented in Stewart (1939) for the groups and their territory, calculation yields a population density of 1 person per 4.5 square miles for the Kupa and 1 person per 8.4 square miles for the Toe. The density estimate for the Kupa is not too unlike Stewart's data (1938) for the upper Humboldt River groups while the Toe estimate appears too low, possibly due to unreliable population data. Combining both groups, an overall density figure of 1 person to 6.4 square miles is assigned for the region. For another perspective on the suggested population density of the Humboldt Lake area, Heizer (1967:7) has noted:

"If we take the aboriginal population of the Humboldt Lake band of Northern Paiute (Kupadokado) as 900, the number reported by Leonard in 1833, and reduce the territory of this group as mapped by Stewart by eliminating the doubtful southern half lying in Carson Sink south of the Humboldt Range, we find a territory comprising about 2100 square miles. This indicates a population density of 0.43 persons per square mile. . . which is, all things considered, a density approximating that of large parts of aboriginal California and far greater than Stewart (1938:46-48) finds for all except a few, small, specially favored areas of the Great Basin."

Obviously further population enumeration and density studies along the lines suggested by Shimkin and Reid (1970) are desperately needed for this area and the Great Basin in general.

Northern Paiute - The Toe and Kupa

The ethnographic data concerned with the Northern Paiute groups of the Humboldt and Carson Sinks is of varying quality and quantity. Among the main ethnographic sources are the observations and researches of Lowie 1924a-b; Stewart 1939, 1941, 1966; Stewart 1938, 1955, 1970; Stewart and Wheeler-Voeglin 1974; Wheat 1959, 1967; Heizer 1960, 1970a-b; Hopkins 1883; Scott 1966; DeQuille 1963; Loud and Harrington 1929; Remy and Brenchley 1861; Simpson 1876; Kern 1876; Hague 1877; Culin 1907; Underhill 1941; Harrington 1933; Robertson 1977; Leonard 1934; Shimkin and Reid 1970; Fowler and Fowler (ed.) 1970, 1971; Kelly 1938; Dansie 1975; Natches 1923; and Heizer and Hester 1972 among many others.

For the purposes of this overview, the two groups within the study area have not been treated separately. Unless stated, the data presented in the following sections applied to the region as a whole since the bands apparently followed similar lifeways in environmentally equivalent areas. The ethnographic material discussed below will attempt to portray the aboriginal peoples of the Humboldt and Carson Sinks prior to extensive white contact based mainly on the researches of contemporary observers and subsequent anthropological data gathering and analysis. Archaeological evidence will be used where it contributes to the interpretation of past lifeways. As cautioned previously, ethnographic material gathered from informants may be distorted by prior contact and acculturation with white civilization. However, it may also be an accurate representation/recollection of the aboriginal lifeways and

practices prior to the white intrusion, modification and destruction of the Native American culture. It is hoped that the following survey will provide the reader with a faithful portrayal of life in the region prior to the arrival of Anglo-European civilization. Specific and detailed information can be found in references given in each section.

Subsistence Pattern

The pre-contact Northern Paiute, like other California and Nevada aboriginal groups, relied on a variety of seasonally available plant and animal species for their subsistence. A brief review of the available ethnographic and archaeological literature (Wheat 1967; Lowie 1924a; DeQuille 1963; Shimkin and Reid 1970; Scott 1966; Hopkins 1883; Stewart 1941; Cowan 1967; Roust 1967; Heizer 1967, 1970a,b; Napton 1969, 1970; Heizer and Napton 1970a; among many other sources) has resulted in a tentative ranking of a series of food resource categories, more or less by importance, in regards to their utilization by the inhabitants of the Carson and Humboldt Sinks (Table 1). As is typical of most hunter/gatherer groups, plant foods comprised the bulk of the exploited resources (cf. Lee 1968; Bicchieri 1972; Fig. 12, this report). The aboriginal procurement of these subsistence resources and seasonal exploitation patterns are discussed in some detail below for the Kupa and Toe groups of the study region.

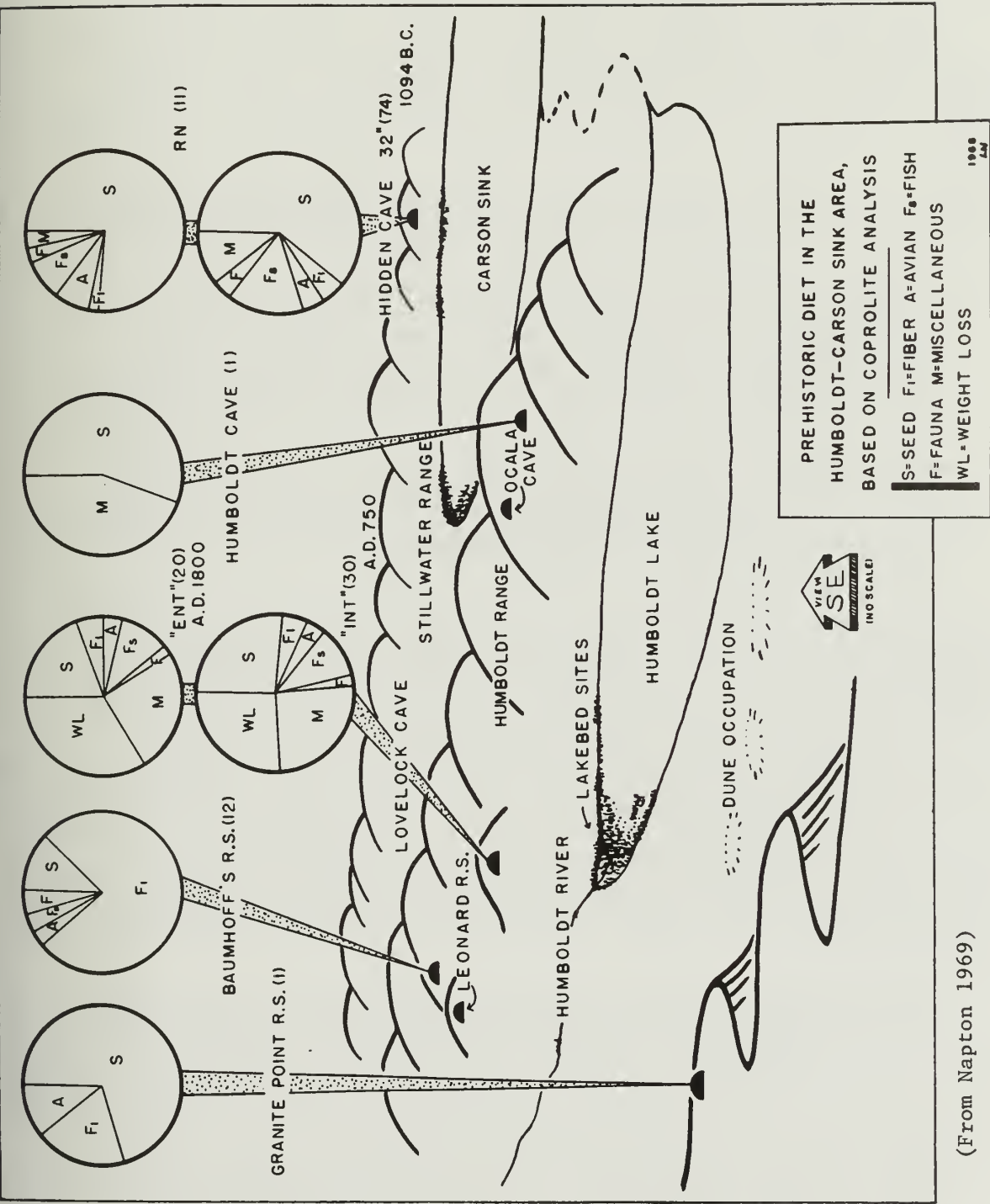
Table 1

Rank Ordering - Subsistence Categories

1. Seeds
2. Roots and Greens
3. Fish
4. Waterfowl and Eggs
5. Small Game (rodents and rabbits)
6. Pine Nuts
7. Insects
8. Medium Game (jackrabbits)
9. Large Game (antelope, deer and mountain sheep)

Gathering

The ethnographic data available for the Kupa and Toe, while detailed in some aspects (cf. Stewart 1941; Wheat 1967; Lowie 1924a; DeQuille 1963; Loud and Harrington 1929; Heizer 1970a) provides little information in terms of amounts collected, daily time spent gathering, or other data on specific utilization of the many collected resources. In fact, as Heizer (1970a:223) has pointed out, systematic ethnographic inquiry of these two groups is extremely limited and hence the information presented below will be limited to



(From Napton 1969)

Figure 12

the data presented in the anthropological literature and other sources.

The gathering of seed plants occurred from late spring through the fall (cf. Wheat 1967). Seed bearing plants were usually collected on a daily basis in the vicinity of either base or temporary camps. The seeds were either used immediately or stored in a cache for future use. The number of species in the area along with their ecological situation (riparian, desert scrub, marsh, riverine) allowed for the almost continuous collecting of this resource by movement from locality to locality (cf. Wheat 1967) over the 'harvesting' season. The seeds were collected by women who beat the seeds free of the stalks and collected them in a shallow basket tray.

"Up this ridge our trail now led us, and on gaining its summit, we found a considerable extent of comparatively level ground, and at first were greatly astonished at seeing before us a newly reaped grain field, thickly strewn with heaps of bound sheaves; in fact, it was a harvest field. The Piute women had here gathered a most abundant harvest of grass seed. On this field of some thirty acres, were heaped up many tons of sheaves, from which the grain had been thrashed. In preparing this seed or grain for bread, they do not pound it in mortars, as do the Diggers, but it is placed upon a great flat stone and ground under a smaller stone used in the manner of a muller. This seed (of the bunchgrass), is said to contain more nourishment than barley...(DeQuille 1963:53)."

Later the seeds were winnowed for extraneous material, ground, re-winnowed, toasted and then ground to a flour for use in a gruel or 'bread' (cf. Wheat 1967; Simpson 1876). Seeds from the cattail (Typha latifolia) were removed, spread on a tule mat or hard, flat, dry area and set on fire to burn off the fine hairs. Turned with a stick while burning, the seeds were not only cleaned but toasted as well (Heizer 1970a)(cf. also Loud and Harrington 1929:159; Harrington 1933; Wheat 1967). These seeds were an important dietary constituent (Cowan 1967; Napton 1969, 1970; Heizer and Napton 1970a; cf. Wheat 1967). The heads or inflorescences of some plants, e.g., sunflowers (cf. Stewart 1941) were picked and processed at the base camp for use. Among the seeds gathered were mustard seed (atsa), mentzelia (kuha), Indian rice grass (wai), cattail (Typha latifolia), tule (Scirpus nevadensis), seabligh (wada) and nutgrass (aabi) (cf. Wheat 1967; Stewart 1941; Lowie 1924a:202).

Roots and greens were collected from early spring to fall with their being of critical importance in the spring owing to their availability at a time when the winter food stores were nearly exhausted. Available on the valley floors, in the marshes and in the foothills, a number of greens and roots were specifically gathered by the Native Americans of the study region. Wheat (1967) and DeQuille (1963) note the gathering of cattail shoots.

"They gather the large stalks of these rushes, and, peeling off the rind, chew the succulent pith. We often met them on the trails with handfuls of this plant, which they seemed to use as often as they were thirsty, in (lieu) of water, in the same manner that the natives of tropical countries carry with them on their journeys, stalks of sugar cane" (DeQuille 1963:141).

Other items gathered in this category included small flat plants known as carved-seed (kammissiki), squaw cabbage, yellow cress (Radicula curvisiliqua), Chenopodium album (wada) among others (cf. Heizer 1970b:55-56). Tubers and roots were dug either with a digging stick or gathered by hand. Greens were hand gathered. Tubers, roots and greens were eaten raw or cooked (cf. Robertson 1977). Storage for future use was in the ground in grass lined pits which were covered with grass and dirt (Stewart 1941:376).

Pinenuts (Pinus monophylla - tibipi (Loud and Harrington 1929:158)) were collected in the Pinenut Mountains (Stillwater Range)(cf. Hopkins 1883:75; Heizer 1970b:Note 3; Scott 1966:25) when the crop matured in the fall (September/October - cf. Wheat 1967). Stewart (1933, 1938), Wheat (1967), Lowie (1924a), Loud (Loud and Harrington 1929:158) and others assert that the pine nut was the most important staple Paiute food plant although there is some debate if this emphasis was due to White contact conditions (cf. Hopkins 1883:14-15) and a biased ethnographic record or other conditions (Nissen, personal communication, 1978; Heizer 1970b:Note 4; cf. Bettinger 1975; McGuire and Garfinkel 1976).

Several detailed descriptions by various authors of the pinenut harvest and pinyon camps for Great Basin groups are presented in Busby (1974). For the Carson Sink groups, Wheat (1967) and Loud (Loud and Harrington 1929) have described the harvest and associated ceremonies (cf. also Lowie 1924a:202-203; Stewart 1941:374-375). When crops were good, some of the people may have wintered in the pinyon groves close to their nut caches (Wheat 1967:15) but the majority of the people returned to their camps near the marshes on both the Carson and Humboldt lakes. Whatever was left of the pinyon harvest that could not be transported to the marsh camps was cached in shallow, occasionally lined pits and covered with grass, brush and stones (Stewart 1941:374). These sites were the private property of the group which had gathered them. Nut preparation was by roasting in a basketry tray with shells then removed by rubbing on a metate. The nuts were eaten whole; boiled in water; dry as a flour; as a paste of water and flour; or as a soup or mush cooked in a basket with hot rocks (cf. Wheat 1967). Loud (Loud and Harrington 1929:159) notes the prime importance of pine nuts as a staple food and indicates that different bands held proprietary rights to certain gathering tracts. Poor crops probably forced the intensive utilization of substitute foods in the marsh and desert scrub areas of the gathering territory.

Several species of berries were utilized. These were usually sun-dried and stored for future use (Stewart 1941:374) or cooked, the seeds removed, and made into a pudding (Robertson 1977). Some of the collected species utilized were buffalo berry (Shepherdia argentea - weyupuie) (Loud and Harrington 1929:158) and red-eye (huupui) (Wheat 1967:10).

Another use of the tule (toi) was the collection of its pollen in July for baking into a bread-like substance. The pollen, mixed with a little water and formed into cakes, was put on a green tule layer in a heated firepit, covered with tule and coals, and left to roast for several hours. It was eaten immediately (Heizer 1970a:235-236; Wheat 1967:11). Of interest to early travellers in the Humboldt Lake area (cf. Woodward 1938) was the

aboriginal gathering of honey dew "sugar", the minute sweet droppings of sucking insects such as aphids, scales and whiteflies. At Humboldt Lake, arrow cane (Phragmites) and cattail rush (Typha latifolia) produce honey dew. This was gathered in September or October, threshed on tule mats, and winnowed to remove extraneous matter (Heizer 1945). It was stored for future use or immediate consumption. The cactus fruit was also eaten by the Toe and Kupa (Stewart 1941:374).

Hunting

Hunting was either on an individual or communal basis usually by the male members of the group. Resources provided from this source probably provided ca. 10-15% of the group's total subsistence base (cf. Fig.).

Small game, comprising both the cottontail rabbit (Sylvilagus nuttallii) and the small rodents, was an important source of hunted protein. Both the cottontail rabbit and rodents were taken by individual hunters using either a bow and arrow or through the use of traps and snares (cf. Loud and Harrington 1929:154-156; Wheat 1967; Stewart 1941). Burrowing animals were dug, flooded, or smudged out of their holes (Wheat 1967; cf. Stewart 1941; Heizer 1970a). Stewart (1941:371) has noted a number of animals eaten by the two groups among them mink (pai'una), field mice (pongatsi), kangaroo rat (kotsi), wood rat (toka'wa), woodchuck (kidu), squirrel (ikwu), ground squirrel (kobo or kupa), and chipmunk (woda'a), among others. These were prepared for consumption by being buried in the coals after the entrails had been removed and the skin sewen up with a stick (Wheat 1967:8). Small game provided a consistent supply of meat throughout the year (especially the lagomorphs - rabbit family) due to its year round availability.

The jackrabbit (Lepus spp.), a medium game animal and the antelope (Antilocapra americana), a large game animal, are most common in the desert scrub and upper sagebrush meadows although Lowie (1924a:197) notes that antelope were confined to the mountains in the Fallon area. Both were commonly taken by communally organized drives during the late summer and fall usually prior to or during the pinyon "harvest", although the Kupa apparently preferred early spring (Hopkins 1883:55-57). The drives were commonly regarded as great social events and courting periods for the young people of the group. Hopkins (1883:55-57) has described the taking of antelope in the Humboldt Lake area by the special method of "charming." The antelope herd was charmed by two men who went around the herd on five successive nights with sagebrush torches. Half a dozen large sagebrush mounds and stone piles were constructed in a circular pattern near which, at early morning and again in the evening, smoking, drumming, singing and other magic acts were conducted. On the fifth night, the antelope were 'charmed' so that they followed the men with the torches up to a sagebrush piles where they were easily killed (cf. Hopkins 1883:55-57). This method is widely known for the Great Basin (Park 1938:139-144; Stewart 1938:34-35; Stewart 1941:366-367, 422-423) along with the drive (Stewart 1938:34-35), the surround (Stewart 1938:36), and the disguise (cf. Stewart 1941:366-367). Apparently the charming method was the only communal method practised by the Humboldt Lake people (and the Carson Sink group as well) with individual stalking used by isolated hunters as well (Stewart 1941:367, 369). Lowie

(1924a:305) suggests the possible use of an enclosure or corral by the Fallon (Toe) group although the details are vague (cf. Lowie 1924a:304-305 for additional antelope hunt details). Steward (1938) notes that drives usually occurred every 10-15 years as the antelope population suffered a considerable loss from this hunting method.

Rabbit drives involved a communal effort with the animals being driven by lines of men, women and children into a net(s) strung in a large semi-circle. Clubs and bow and arrows were used to kill the rabbits caught in the net (Heizer 1970a; Lowie 1924a; Stewart 1941; Wheat 1967; Loud and Harrington 1929:155-156, among others). For the Fallon area the literature suggests that only the men did the hunting (Lowie 1924a:197-198; Wheat 1967). The drives usually lasted 5 days (Stewart 1941:368) and were under the control of a specially chosen "Rabbit Boss" (Lowie 1924a:197-198). The rabbits were either roasted in the hot ashes or over the open coals after their entrails had been removed. The hides were dried and cut into strips for use in fabricating rabbitskin blankets. The skinned rabbit carcasses which could not be immediately eaten were air-dried and stored for the winter when they would be boiled or pounded into a flour to make a soup (Wheat 1967:14).

Data on the hunting of other large game animals, deer and mountain sheep, are sparse for the study region. These animals were undoubtedly hunted both communally as well as individually as the overall ethnographic record for the Northern Paiute (cf. Stewart 1941) and the Great Basin (Steward 1938) suggests. Both animals were available in the study area aboriginally - deer in the foothills and marsh/meadows during the winter; in the mountains during the summer with mountain sheep located in the higher more rugged mountainous areas of the Humboldt and Stillwater Ranges. The seasonal migration of both species also offered excellent hunting opportunities (cf. Heizer and Baumhoff 1962; Nissen 1974; Heizer and Clewlow 1973 among others). Lowie (1924a:197) notes that individual hunters stalked deer and antelope utilizing an appropriate disguise and mimicking the actions of the animals. This practice is called tu'hu-itaqwa and it enabled a hunter to enter or approach the herd for a killing or wounding shot. The practice of running down an antelope by tracking it for several days was also utilized. Apparently individual stalking with no disguise was used for mountain sheep although both antelope and sheep were hunted by concealed hunters from blinds (Stewart 1941:367, 369). The use of the deadfall is also noted by Stewart (1941:368) for large animals.

Waterfowl

The several large lakes and associated marshes of the study region attracted a large number of assorted waterfowl, especially during the early spring and fall when the birds were migrating to their summer and winter feeding grounds. A number of waterfowl species, among them ducks, mud-hens, pelicans, snow geese, Canada geese, stilts, avocets, phalaropes, curlews, and killdeer among many others were present on both the Humboldt and Carson Lakes and marshes (cf. Wheat 1967; Stewart 1941:373). Land birds such as quail, sagehen, grouse, dove, and blackbird were available in the desert scrub and upland areas as well (Stewart 1941). In addition to the meat provided by the various birds, their eggs also provided an excellent addition to the

aboriginal diet (cf. DeQuille 1963:39-40, 141; Loud and Harrington 1929:156; Wheat 1967:9-10; Stewart 1941:373).

Communal duck and mudhen hunting drives were held between April and June (Wheat 1967). Both hunts were under the leadership of two head-men.

"One of them would tell the people: "On such and such a day each of you shall make a tule boat for himself. The next day you shall make arrows. Two days after finishing the arrows you shall start." They would go on the water about daylight, led by one of the head-men. There might be as many as thirty or more men in the party. They were led through the tule rushes out on the lake, where ducks and mud-hens were sighted. The hens would try to hide. Then they would divide into two parties, each led by one head-man, and surround the flocks. When they had shot enough, they went home. That evening the head-men told them to come again in two days for another hunt. They would scare the ducks from a small into a big lake. Then the head-man said, "In three days from now we will go close and camp there. We'll start early." Then they would go through the tule on their rafts, sometimes driving the ducks out on dry land. Ducks were also caught in nets (puhu'kwana) stretched between long sticks stuck into the water (Lowie 1924a:197)."

Heizer (1970a) also gives a brief description of netting ducks. Duck decoys were used (Lowie 1924a:197; Simpson 1876:75; Stewart 1941:369; cf. Wheat 1967) and the birds were occasionally killed by breaking their necks with the hands.

Scott (1966:41-42) describes a typical mudhen drive on Humboldt Lake.

"After the entire tribe had assembled, it took a whole day to complete preparations for the hunt. Tule flatboats were handled by those best on the oars and were stationed miles out in the water to push and shoo the birds toward the mouth of the Humboldt. The younger boys, women and girls were placed at intervals in the bushes on land at the edge of the water. Cap John and Mo-be-ti-wak and the strongest men handled the big nets which were stretched across the mouth of the river. Everyone knew his position, everyone had to take part. Each person slept near his place so as not to frighten the birds by moving in the early morning light.

When the birds ventured out of the water, those stationed along the shore caught them and broke their legs instead of winging them. All the Indians knew the slim legged fowl could run faster than they could fly. Driving the mudhens into the net was careful and tedious business. A second net was stretched in back of the first, and as Cap John and Mo-be-ti-wak caught several hundred birds in its meshes, they pulled it out and gave it to the people waiting on land; these people killed the birds while the strong men took care of the next net.

After three hours of shooing the birds toward the mouth of the river and into the net, the boats gradually came together in a semicircle. This gave some birds time to swim outside the boats and escape.

Others dived between the boats and, swimming back of them, also escaped. Even so, the Indians had slaughtered thousands of them. When all the boats touched, the hunt was over. The men came ashore and everyone was busy for hours preparing for the feast to be held in the nearest village. This year, it happened to be Cap John's emigrant station where they cooked the mudhens. They fried some in grease, and jerked or dried others in the sun to keep for winter. They danced and chewed mudhen bones for three days."

As was the case with the rabbit drives, other neighboring groups were invited to participate and share in this event (Lowie 1924a:197).

An interesting variant has been reported by Gilmore (1953) for the Carson Sink in regards to duck hunting.

"Canvas-backs, in large numbers were spotted in deepwater sloughs. The hunter took off all of his clothing, placed a helmet made of moss over his head and attached a belt to his body. He waded out in the water right among the ducks, casually pulled them under the water, crushed their skulls, broke their legs and placed them under his belt. He came out of the slough with his belt full of ducks. It is surprising how easily the hunter fooled the ducks by submerging his body and leaving only his moss-covered head above the surface of the water. The ducks were at perfect ease, since the moss-covered head matched the surrounding plant life and there was no indication that a man was in their midst."

Preparation usually consisted of cooking over a fire or burial for roasting in a firepit of hot ashes. Waterfowl were also air dried for winter use (cf. Heizer 1970a:235). Land birds were either snared, trapped or shot with an arrow (cf. Stewart 1941; Loud and Harrington 1929:157).

Eagles were also captured for their feathers and then released although Stewart's data (1941:370) suggests the rearing of young, captured eaglets as well. Eagle feathers were important in ritual and curing ceremonies as they were thought to have certain powers (cf. Steward 1938; Park 1934; Heizer 1970b:58; Scott 1966).

Fishing

Fishing was of some importance to the groups present in the study region at certain times of the year (Jan-March, May) but probably was only a peripheral activity when compared to the exploitation of other food resources (cf. Shimkin and Reid 1970:174). Loud (Loud and Harrington 1929:156) identified a number of species utilized by the Northern Paiute through informant testimony. Five of these were found in Humboldt Lake (primarily suckers and trout) and quite probably Carson Lake as well. Stewart (1939) notes that both the Kupa and Toe arrived at Pyramid Lake each spring to exploit the fisheries there. Wheat (1967:8-9) notes that the Carson Sink group fished for winter trout (tommo?agai) during January to March and in May joined their 'cousins' on the Truckee and Walker Rivers

and at Pyramid Lake to gather shiners, suckers, cui-ui and spring trout (tama?agai) on their spawning run. "If famine had occurred during the winter, the weak ones often perished before reaching their destination - or failed to survive the feast (Wheat 1967:10)."

A number of fishing techniques were utilized by the Kupa and Toe. Weirs with an associated platform were utilized to catch winter trout (Wheat 1967:8). Harpoons are known (Stewart 1941:371). Fish drives are known as well as hand catching. Elongate baskets, either held in the hand or staked in the water, were utilized as well (Stewart 1941:371). Fish nets, similar to rabbit drive nets, were used year round (Stewart 1941:371). Dip nets were used for catching minnows (Heizer 1970a; cf. Ambro 1966). Hand fishing utilizing composite, acute-angled bone and wood fishhooks (cf. Loud and Harrington 1929:Plate 5; Heizer and Krieger 1956:Plate 11b; Fowler and Fowler 1970:186) were used for deep pool or lake fishing. Various baits were used, among them; minnows, grubs, and grasshoppers (Stewart 1941:371). Ice fishing with nets, spear or hook was practiced in the winter (cf. Wheat 1967). Small balsas, about 12 feet long and made of tules (cf. Wheat 1959, 1967; Heizer 1970a:235) were used for lake fishing.

Fish preparation practices varied but there is little information available on the two groups. Fish were dried in the shade for future use (Stewart 1941:376; Wheat 1967:8-9). Minnows, suckers, chubs and smaller fish were often swallowed whole (cf. Napton 1970; Heizer and Napton 1970a; cf. Follett 1967, 1970; Cowan 1967; Roust 1967) while undoubtedly the larger fish were likely cooked over a fire or in the coals. Pounding of dried fish into a flour was denied by the informants available for the Toe and Kupa. Fish eggs were dried with seeds for future use (Stewart 1941:376).

Insects and Reptiles

A number of insect species were eaten by the Toe and Kupa bands. Caterpillars (piego) (cf. Robertson 1977), kutsavi (larvae), ants, ant eggs, locusts (kua), and crickets were collected, processed and eaten in various manners by the aboriginal inhabitants (Stewart 1941:373). Of some interest is A. Hague's (1877) observation of larvae gathering at the Soda Lakes near Fallon. "The water appears to be wanting in animal life, with the exception of a minute fly, accumulating in such large quantities as to form a belt a foot wide along the shore. It is occasionally gathered by the Pah-Ute Indian, and, after drying and pulverizing made into a sort of meal or flour (Hague 1877:749)." Stewart (1941:426-427) notes that the use of this food was apparently denied by his informants.

Lizards and frogs were not identified as food sources by the Toe and Kupa (Stewart 1941:372).

Toe and Kupa Subsistence and Settlement

The ethnographic subsistence adaptation of the groups of the Humboldt and Carson Sink areas emphasized frequent movement by independent family groups similar to the family band pattern of Stewart (1938, 1955, 1970). The largest settlements were probably the winter villages located either in

the pinyon groves of the Stillwater Range if the harvest had been plentiful or in the lowland areas near the lakes and marshes (cf. Wheat 1967). Historic observers have commented on the large number of Indians in the Big Meadows area near Lovelock and along the Humboldt and Carson Lakes (Leonard 1934; Hopkins 1883; Reports, Commissioner of Indian Affairs, various; Simpson 1876; Kern 1876; DeQuille 1963; Remy and Benchley 1861; among others) and it has been proposed that these lakeside areas were the main focii for a year round occupation. Cowan (1967:27) has advanced the hypothesis that the Northern Paiute of the Humboldt Sink (and by extension, the Carson Sink) suffered from their early contact with the whites (cf. Leonard 1934; Kern 1876; Historical Overview, this report) and were forced to abandon their village sites and semi-sedentary way of life for a wide-ranging foraging type of economy such as that presented by the post-contact ethnographers (cf. Steward 1938). If this is so, and the archaeological, ethnographic, and ethnohistorical data apparently hints at the extensive/intensive use of a lacustrine based economy (cf. Napton 1969, 1970; Heizer and Krieger 1956; Heizer and Napton 1970a; Cowan 1967; Loud and Harrington 1929; Stewart 1941; among others), then it is possible that the pre-contact aboriginal inhabitants of the study area permanently occupied the marsh/lake areas and ventured into other subsistence zones (e.g. desert scrub, sagebrush meadows, mountains, etc.) for only brief periods of time - a pattern not dissimilar to that reported for the Owens Valley Paiute with their permanent villages (Steward 1933). It is unfortunate that Cowan's (1967) theory cannot be confirmed with informant testimony and must be tested with the available ethnohistorical, ethnological and archaeological data (cf. Heizer 1970a:242).

These winter villages were apparently broken in the spring as individual band families began the spring-summer-fall cycle of successive short term occupations at the scattered camps necessary to exploit the plant and animal resources of the study region. Springtime settlements focused on both the lake/marsh and desert areas for the collection of roots, greens, seeds and berries. Hunting concentrated on small and large game, especially waterfowl. A communal antelope drive was conducted if conditions were favorable although this was an infrequent event. Fishing was practiced in both the lakes and rivers.

The late spring and early summer months saw a migration to the Pyramid Lake area for fishing with the Kuyuidokado group. Seed and berry harvesting, duck and game hunting continued with the return to their home territory. Late summer and early fall saw a move to the pinyon groves of the Stillwater Range for the nut harvest. Hunting of deer and mountain sheep, as well as the individual hunting of antelope, continued on their summer range in the mountains.

Communal rabbit drives were the main hunting activity of the fall, although other hunting activities were continued as well by individuals. In conjunction with both the pinyon harvest and the rabbit drives, the major social activities of the year took place - feasting, gambling, courtship, dancing, etc. - both in the pinyon groves and at the lowland camps. The end of the pinyon season and first snow saw the return of the majority of the people to the main camps located in the marsh/lake areas to pass the winter

months. Individual rabbit hunting and fishing and the utilization of stored foods occurred during the winter along with social activities designed to pass the time until spring. A general summary of the "seasonal round" is presented in Table 2.

Socio-Political Organization

From the available post-contact ethnographic data, the sociopolitical organization of the Toe and Kupa generally conforms to Steward's (1938, 1955, 1970) family band model. Using data gathered during his research among Great Basin ethnographic groups Steward (1938, 1955, 1970) has postulated the "nuclear family" or "family household" as the basic socio-economic unit. Several other scholars have disagreed with Steward's interpretation of Great Basin sociopolitical organization (cf. Service 1962; Fowler 1966) but for this report his views will be generally accepted although terminology and concepts introduced by other researchers will be used to elaborate on Steward's material.

D. Fowler (1966) has argued that the emphasis on Steward's "nuclear family" concept as the basic socioeconomic unit seems unwarranted and has suggested the term "kin clique" as an alternative. This grouping has the nuclear family as the focal point or core of a group of related persons allied together as the "normal" socioeconomic unit. The use of this term takes note of the fact that "households" or "camp groups" were composed of related persons (cf. Shimkin and Reid 1970:176 for the Toe). Relationships could be either affinal or consanguineal and particular relationships could vary from place to place through time. The post-contact sociopolitical situation of the Carson and Humboldt Lake groups can be considered as operating as "kin cliques" (cf. Shimkin and Reid 1970:176-177) with its activities and decisions dictated by "family" interests without reference to any larger groups (e.g. villages, bands, tribes, etc.). This, of necessity, made any large groupings, e.g., the winter village, fluid in character as each kin clique determined its own pattern of movement.

The general picture of Great Basin social organization has been summarized by Murdock (1955:91):

"All these tribes live in semi-nomadic bands of shifting composition. Residence is fluid, being optionally either exogamous or endogamous with respect to the band and either patrilocal or matrilineal, with slight preference for the latter. Independent nuclear families are the norm; polygyny is comparatively rare and nearly always sororal; and extended families do not occur. Descent is bilateral. Unilinear kin groups are completely absent, and kin terms are of Hawaiian type in twenty-two out of twenty-five tribes for which information is available."

Specific features have been listed by Fowler (1966) while Shimkin and Reid (1970) have listed a number of salient items for the Toe. In general, the post-contact Toe (and by extension the Kupa) conform to the picture presented in Murdock (1955).

Table 2

Toe and Kupa - Seasonal Round

<u>Season</u>	<u>Area</u>	<u>Activity</u>
Spring	Lake/Marsh areas; Desert scrub	Leave winter camps; collect early roots and greens; hunt small game; large game if available; communal antelope drives; fishing in river and lakes; duck and mudhen drives and nettings; seed and berry gathering; fishing at Pyramid Lake
Late Spring/Early Summer	Pyramid Lake	Fishing; misc. gathering of plants
Summer	Marsh/Lake areas; Desert scrub	Seed and berry harvesting; duck hunting/drives; cattail pollen collection; hunting of all game; gathering of misc. plant resources
Late Summer/Early Fall	Stillwater Range	Pinyon gathering
Fall	Desert uplands; marsh margins; mountains	Communal rabbit drives; major social activities; courtship; seed gathering; raw fiber material gathering and manufacture; fishing; small and large game hunting
Winter	Winter village; marsh/lake areas	Return to lakeside/marsh villages; minor lake/river fishing; rodent, rabbit hunting; manufacture of fiber; use of stored foods gathered during the spring, summer and fall

(From Wheat 1967 and others)

Informal leaders of the Toe, men of personal ability and initiative, often organized a variety of temporary operating groups to conduct economic, ceremonial and recreational activities, often on a large scale and sometimes at the interband level. These included communal rabbit, antelope and mudhen hunting among others. No formal chiefs were known although respected men of ability often provided band or special activity leadership. As Shimkin and Reid (1970:178) have pointed out, the aboriginal situation of the Toe is poorly known especially in regards to social structure and customs. As they note, "Most broadly, Toitekade society appears to have constituted a lattice rather than a focused structure, effectively integrating and maximizing limited and evanescent resources but little geared to accumulation and consistent social direction. The system can best be viewed as an adaptation providing survival under conditions of high risk..." (Shimkin and Reid 1970:178). An aspect of some interest is Shimkin and Reid's (1970:178) suggestion that the basic configuration of the Toitekado seems to be a dilution of that of Owens Valley (cf. Steward 1933). If so, then the pre-contact Toe and Kupa social organization and subsistence/settlement pattern was probably characterized by permanent villages, relatively specialized subsistence patterns and stable social groupings in contrast to the shifting settlements, unspecialized subsistence patterns and fluid social groupings known for post-contact times (cf. Cowan 1967). Future archaeological research centered on the open sites of both the Carson and Humboldt Sinks may help to illustrate past social patterns as well as provide information supplemental to the ethnographic record.

Village size and population data are scanty for both groups although for the Kupa they must have been substantial as both early historical accounts and the Indian Agent reports, various, suggest a rather concentrated population in the Humboldt Sink (cf. Leonard 1934; Population, this report). For the Toe, DeQuille's (1963) observations indicate a basic village of 15 shelters as the core with a number of outlying shelters.

"After passing a few scattering huts we traveled about one mile when we passed a small town of some half dozen noobees or shanties and saw, some distance ahead, a larger village.

Long before we reached the large village, which contained some fifteen or twenty noobees, the inhabitants had spied us, as we could see by their gathering into groups and pointing toward us" (DeQuille 1963:30-31).

Postulating between 6 and 7 persons per noobee (cf. Robertson 1977) it is probable that small groups (small towns) had between 35 to 42 people resident while the larger villages could have had from 120 to 140 inhabitants, a rather sizeable group. An archaeological site of some size is NV-Ch-15, the Humboldt Lakebed site, a rather large village site. This site is the probable birthplace of Sarah Winnemucca Hopkins (1883). Studies similar to those conducted by Cook and Heizer (1965) on population and settlement size may prove to be of some value in the study area.

Structures and Architecture

The construction of huts, shelters and other protective features varied widely depending on the season, exposure and available materials. Semi-circular brush shelters, low brush and rock pile windbreaks and conical or domed pole and rush/brush houses were among the several common types of constructed shelters for the groups of the study region (cf. Stewart 1941). Apparently both men and women participated in shelter construction (cf. Scott 1966) although DeQuille (1963:30) notes that the women built all of the houses.

The most common house was about 15 feet in diameter and 7 or 8 feet high. A conical framework of willow poles, stuck in the ground and attached together at the top ring, which formed the smokehole, was covered with tule mats, about 2 x 3 feet in dimension. Cut grass or tule matting covered the floor. A firepit was present in the center (Heizer 1970a; Stewart 1941). Annie Lowry, a Northern Paiute from the Lovelock area (Scott 1966:76) describes in some detail the construction of one of the karnees (cf. also Robertson 1977). Similar houses are illustrated in Heizer (1960:Plates 6 and 9), Cowan and Clewlow (1968:Plates 2a, 2b), Wheat (1959, 1967), Robertson (1977) and noted in Stewart (1941). Domed structures similar to the above cone shaped houses were also known (Stewart 1941). Both types had covers of varying thickness depending on the weather (cf. Stewart 1941:377-378).

Brush or rush shelters/windbreaks were also common. DeQuille (1963) noted a form on the shores of Carson Lake:

"Their habitations are merely shades to protect them from sun. They are made by planting willow brush and reeds into the ground, in a semi-circular form, a southern wall for shade. There is no roof. Some of the walls are portable, being woven of reed and flag in the shape of a large mat. The women build all the houses. They generally built at the distance of half a mile from the Lake, on account of the swarms of mosquitos found near the water (1963:30-31)."

Similar structures were reported by Jules Remy in 1855 for Humboldt Lake.

"A few miles east of the places referred to, on the summit of a sandy dike, were six wigwams, full of women and naked children. These wigwams, soley composed of rushes set upright in a line, to form a shelter from the mid-day sun, were roofless and without the slightest protection to the south, east and west. A rush mat propped up lengthwise, pointing east and west, and suspended almost vertically, gives the best idea of these primitive habitations (Remy and Brenchley 1861:I: 81)."

Of some interest is Heizer's (1970a:235) report of a floating house similar in construction to the conical tule house except it rested upon a raft made of willow logs bound together, on top of which were laid large round bundles of cattail rush. This floating base was then covered with a thin layer of earth and the structure poled out into the lake and anchored with a large stone. Heizer (1970a:235) suggests it was used as a fishing platform or 'safe house' during times of attack. No other instances of this house are noted in the ethnographic literature.

Sweathouses were not used among these groups in pre-contact times but are now used at Fallon having been acquired from the northern tribes (cf. Curtis 1926; Lowie 1924a; Stewart 1941).

Material Culture

A number of material culture items have been described by various ethnographers and observers of the Toe and Kupa. A series of brief descriptions and uses of selected items are presented below. Omer Stewart's culture element distribution list (1941) should be consulted for additional items and detailed descriptions (see also notes within).

Basketry

An extensive use of basketry was made among the Toe and Kupa groups in their everyday living activities. Both coiled and twined baskets were made and used. Data on basket materials, manufacturing techniques and forms can be found in Stewart (1941:386-387, 433-434), Heizer (1970a:236-237) and Loud and Harrington (1929:159-160). The most characteristic categories of basketry items in use by the Toe and Kupa groups were:

1. Storage/Container baskets
2. Burden baskets
3. Seed beaters
4. Winnowing trays
5. Water bottles
6. Hats
7. Cradleboards
8. Tule and rush matting

Women made the baskets having learned the techniques from either their mother or grandmother. Wheat (1967) should be consulted for additional contemporary basketry manufacturing details.

Cordage (wiha) for twine, nets, etc., was of a two-ply construction made of pounded/chewed and twisted fiber. Heizer (1970a:237) notes that the dry stalks of dogbane or the bark of the Indian hemp plant (*Apocynum*) was used. String was primarily manufactured during the winter months (Wheat 1967).

Clothing

A minimum of clothing was the rule rather than the exception for most Great Basin aboriginal groups. The Kupa and Toe were typical in regards to dress. In good weather the men wore nothing (cf. DeQuille 1963:30-31). Women wore a short two-piece skirt of shredded tules (Heizer 1970a:237). A few people may have had a buckskin shirt or dress but these were not common. Cold weather protection was usually a rabbitskin blanket or cape made of

70-80 rabbitskins which had been killed in the fall during the communal rabbit drive (cf. Wheat 1967 for a description of the weaving process). The blankets also served as bedding and a large one could cover a small family. Leggings of a number of materials (buckskin, tule, etc.) were occasionally worn as were coyote skins hung over the chest and back for cold weather protection (Heizer 1970a:237; Lowie 1924a:217). Buckskin and vegetal fiber moccasins and sandals were also worn occasionally with a fiber lining or fill (cf. Lowie 1924a:218).

Milling Equipment

Seeds were ground on a "portable" metate (mata) with a muller or mano (tusu)(cf. Lowie 1924a:203, 204, 215). Stone mortars and pestles were used for seed processing but the manufacture of these items was attributed to the Saiduka, a people who occupied the area before they were driven out by the Northern Paiute (Heizer 1970a:236; Stewart 1941:381; see Mythology, this report). Bedrock mortars were known and used by the Toe (Stewart 1941:381).

Pottery

Pottery was not manufactured by these two groups although clay dolls were made by the children (cf. Stewart 1941:389; Scott 1966).

Weapons

The Kupa and Toe used a short to medium length (up to 4 feet) sinew backed bow usually of willow wood but occasionally of juniper and cedar. Self bows (soroado) are also known and ranged up to 4 feet in length. These bows were strung with either some form of twisted cord or deer sinew (Stewart 1941:384; Heizer 1970a:236).

Arrows (pongosuh) were of cane or rosewood and ranged from 2 to 3 feet in length. The shafts were straightened on heated stone shaft straighteners. Two to four feathers, from the crow or chicken hawk, were used and these were bound to the notched end with glue or sinew. Cane shaft (wekwikoba) arrows had pointed greasewood foreshafts (kutsa)(Heizer 1970a:236; Stewart 1941:384).

Chipped stone arrow points were used. A special arrow was used for birds. The striking surface of an arrow was enlarged with two pairs of short sticks tied at right angles across the end (Stewart 1941:384). Plain wooden points were used for rodent and rabbit hunting (Wheat 1967).

Poisoning of the arrow point was practiced. Heizer (1970a:236) notes the use of rattlesnake venom and Stewart (1941:385) notes the use of decayed meat, liver, decayed blood from the heart, and a red ant poison.

Slings were known (Stewart 1941:386) but they were apparently only used as a toy.

Boats

A balsa boat (saisaki) that would carry from one to three persons,

depending upon the size of the craft, was made for a number of purposes. Propelled by an 8 foot pole, the small boats were 12 feet long, and made of four double-tapered bundles of tule stalks (Heizer 1970a:235; cf. Stewart 1941; Wheat 1967 for a detailed description of the manufacture of this type of boat at Stillwater in the Carson Sink; Lowie 1924a:249-250). These rafts were used for fishing (Heizer 1970a) or for mudhen and duck hunting (Lowie 1924a:249-250).

Decoys

Duck decoys (saipuhuta) were made by skinning a duck and forming the skin over a tule rush body. These were set out and anchored with a cord attached to a rock weight. A number of decoys have been recovered from archaeological sites in the Humboldt Sink (Loud and Harrington 1929:114-115); described in early accounts (Simpson 1876); and manufactured until recent times (Loud and Harrington 1929:114; Lowie 1924a:Fig. 1; cf. Wheat 1967 for a detailed description).

Musical Instruments

A number of noise producing instruments are known for the Kupa and Toe. Flutes (woina) were of elderberry and approximately 12 inches long with four holes. They were used for a number of purposes including shamanistic activities. Split-stick, deer's ear and deer's hoof rattles were known as were a number of drums. The bullroarer was used as was a willow whistle (Stewart 1941:403-404). Hopkins (1883:56) describes a special type of drum played with a rubbing motion that was used in the antelope charming ceremony.

Singing

Singing was an important part of dances, ceremonies and various activities (cf. Lowie 1924a; Hopkins 1883; Scott 1966; Stewart 1941). Very few songs have been preserved for the Toe and Kupa. Heizer and Hester (1972) present several Northern Paiute songs for groups to the west of the study region.

Dancing

A number of dances are known for the Toe and Kupa and were held in conjunction with specific ceremonies. Detailed information is lacking for the groups but Lowie (1924a:305) notes a day long Rabbit Dance (qamunoqo) prior to the communal rabbit hunts in the fall as well as five day "Squaw Dance" for the Fallon area. Hopkins (1883:47) describes a "festival of flowers" dance for young women in the spring or summer in which the girls sing about (and dance) their chosen flower or rock names. The cicle dance (nugava) was a popular dance and was performed at almost any occasion including the fall pinyon harvest and at various times in the spring and summer. This multi-purpose dance (cf. Stewart 1941:415-416; Curtis 1926) was held within the confines of a brush corral with a center pole to dance around. The dancers sang during the performance. The women of the group chose partners (usually their husbands if married) and within the single circle men and women alternated. A shuffle step was used with the dance circle moving in a

clockwise direction. A special dance leader organized the dance and provided leadership during its duration. The dance was an especially favorable time for courtship (cf. Curtis 1926). Its duration was from 5 to 6 days. Stewart (1941:416-417) mentions several other dances and Lowie (1924a:307) mentions a "jump dance" and war dance although it is unclear which groups performed these. Thomas (1972) should be consulted for a social interaction analysis of the "fandangoes" (communal gatherings) or dances and the implications for the Shoshonean "lifeway."

Games

A number of games are known for the Toe and Kupa groups (cf. Stewart 1941:395-401; Culin 1907; Heizer 1970a:238-239). The games can be loosely separated into gambling and athletic games although the two categories are not mutually exclusive. Gambling was a favorite pastime especially at the communal gatherings. The hand game, basket hiding game (or variant) and stick dice were all popular games of chance. Athletic games included hoop and pole, ball race (wutakoi), football (watsimwe), shinny (natzi'tsaka), archery (nadukwoto), wrestling, races and so on. These all involved physical activity although gambling was often involved in some of the games or contests. Stewart (1941:395-401) presents a detailed list and descriptions of several of the games.

Personal Ornamentation and Facial/Body Decoration

Personal ornamentation took a number of paths. A nose ornament of a solid, round piece of bone was sometimes worn by males (Heizer 1970a:237; cf. Heizer 1960 for a view of Chief Winnemucca). Women did not wear a nose ornament although the ear lobe of both sexes was often pierced to receive an ornament of bone or shell or some other natural material (Stewart 1941:390). Beads (tsome) were made of stone, bone, shell, animal claws, glass (contact times) or other materials (Heizer 1970a; Stewart 1941:391). Shell beads and/or pendants made from various imported and local shellfish (cf. Loud and Harrington 1929; Bennyhoff and Heizer 1958) were often worn. Turquoise was known but was rare and considered valuable (Heizer 1970a:238). Stone beads were manufactured from a local white marble found in the Stillwater Range. Individuals owned 'claims' of marble in this region and charged a fee for its use after granting permission to obtain the material (Heizer 1970a:238).

The Toe and Kupa used both face and body paints although tattooing for body ornamentation was apparently not practiced (Stewart 1941:390). Both sexes used paint, usually black, red, white and yellow, for a number of purposes including decoration for social gatherings, for bad dreams and in the case of women, to signify the end of their menstrual period (Stewart 1941:391; Scott 1966:37; Heizer 1970a:235). Straight lines, dots, snakes and a number of other designs were used (cf. Scott 1966:37). The colors were obtained from local natural earth or minerals and were mixed with deer or mountain sheep or elk grease before application with the fingers of a blunt-ended stick (Heizer 1970a; Scott 1966:37-39; Stewart 1941:391). No pigments were applied to the hair (Stewart 1941:391).

Birth and Childhood

A number of customs and rituals were observed by the Toe and Kupa as part of the childbirth ceremony (cf. Stewart 1941). No particular rituals or taboos were apparently observed by a woman during her pregnancy as she was expected to carry her share of the daily burden. The birth took place in a karnee away from the main village with the mother attended by older female relatives or friends (Scott 1966:46-47). When the baby was born it was bathed, wrapped and placed on a cradle.

"They go to a wigwam of their own, where they live till the first child is born. This event also is celebrated. Both mother and father fast from all flesh, and the father goes through the labor of piling wood for twenty-five days, and assumes all his wife's household work during that time. If he does not do his part in the care of the child, he is considered an outcast. Every five days his child's basket is changed for a new one, and the five are all carefully put away at the end of the days, the last one containing the navel-string, carefully wrapped, and all are put up into a tree, and the child put into a new and ornamented basket. All this respect shown to the mother and child makes the parents feel their responsibility, and makes the tie between parents and children very strong" (Hopkins 1883:49-50).

The mother was confined for a period exceeding twenty-one days after birth and could not see her husband or any male relative during this time (cf. Scott 1966:46-47; Hopkins 1883:49-50). A number of rituals were also observed. The father followed a similar set of rituals and restrictions (cf. Scott 1966:46-47; Hopkins 1883:49-50; Stewart 1941:409). No special ceremonies occurred during the initial months after birth. Infanticide and abortion were not practiced (Stewart 1941:409).

Children were taught to be clean, neat, quiet and to respect elders (cf. Hopkins 1883:45-57). The mother and grandmother raised the children but quite probably any family member cared for and punished them. Their fathers instructed the boys in male pursuits while the women taught the girls the appropriate female tasks and behaviors.

Puberty Rites

For a girl the ceremony occurred after her first menstruation (muhadanomani) and was essentially a physiological treatment for health, preparation for childbirth, marriage and an industrious life. Hopkins (1883:48) has presented a detailed description of the ceremony. The girl was secluded with two older friends in "...a little wigwam...just big enough for the three" and undertook a series of ritualistic tasks for twenty-five days. Every day she had to gather and pile up as high as possible five stacks of wood. Her attendants, at the end of each five day period, took her to the river to bathe. As well, at the end of each five day period, she was presented to the village group as a young lady ready to marry (Heizer 1970b:59). She abstained from meat for the whole twenty-five day period subsisting on berries, pine-nuts and various seeds (Heizer 1970b:59; Scott 1966:37). Subsequent menses required

isolation from the main village, and especially from men, for periods of 3 to 5 days in a special karnee (Hopkins 1883:48; Scott 1966:35-36). At the end of the initial puberty ceremony, the girl returned to the main group and gave all of her clothing to her attendants. The ceremony was an announcement of her coming of age and availability for marriage (cf. Stewart 1941:410-411 for details on the ceremony).

The boy's rite occurred only once and can be considered as both a hunting ritual and coming of age. Hopkins (1883:50-51) describes the ceremony in some detail (cf. also Stewart 1941:411).

"Our boys are introduced to manhood by their hunting of deer and mountain sheep. Before they are fifteen or sixteen, they hunt only small game, like rabbits, hares, fowls, etc. They never eat what they kill themselves, but only what their father or elder brothers kill. When a boy becomes strong enough to use larger bows made of sinew and arrows that are ornamented with eagle-feathers, for the first time, he kills game that is large, a deer or an antelope, or a mountain sheep. Then he brings home the hide, and his father takes his quiver and throws it on his back as if he was going on a hunt, and takes his bow and arrows in his hand. Then his father throws the loop over him, and he jumps through it. This he does five times. Now for the first time he eats whatever he kills... He can now do whatever he likes, for now he is a man, and no longer considered a boy."

Marriage

Marriages were usually arranged by the parents of the bride and groom and took place with a minimum of ceremony (cf. Scott 1966:36). An exchange of presents preceded an arranged marriage with rejection of the gifts indicating rejection of the prospective partner (Stewart 1941:404).

"In the Paiute country, when an Indian girl was old enough to marry, her mother, not the chief, was consulted. The boy's mother came to see the girl's mother and the two older heads made all the arrangements. Sometimes a boy would decide he desired a certain Paiute maiden and would persuade his mother to talk to her parent, but never, not under any circumstances, was the girl allowed to speak a word. She must be the wife of whoever was chosen for her. Sometimes she would put up a vicious fight, but in the end she was compelled to submit to the wishes of her parents, especially her mother (Scott 1966:36)."

"The Paiute marriage customs were always strict. It was arranged between the mothers of the contracting parties and the girl was not consulted at all. The mother of the boy would suggest a certain girl for her son's wife, and if he liked the idea, his mother talked to the girl's mother. Often the son picked out the girl and asked his mother to make the arrangements. The ceremony took five days. On the night of the first day, the man slept on the outskirts of the future wife's grounds. He went home each day, but returned to sleep a little nearer his intended each night. On the morning of the fourth day, he went out to hunt and

brought his day's kill for the girl to prepare and cook for him. On that night, he slept beside her bed. On the fifth day, the marriage vows were considered final. From that time on, custom decreed that they live with and care for her parents (Scott 1966:85)."

However, Hopkins (1883:48, 49, 50) describes a somewhat different version, similar in some ways but different in others.

"He never speaks to her, or visits the family, but endeavors to attract her attention by showing his horsemanship, etc. As he knows that she sleeps next to her grandmother in the lodge, he enters in full dress after the family has retired for the night, and seats himself at her feet. If she is not awake, her grandmother wakes her. He does not speak to either the young woman or grandmother, but when the young woman wishes him to go away, she rises and goes and lies down by the side of her mother. He then leaves as silently as he came in. This goes on sometimes for a year or longer, if the young woman has not made up her mind. She is never forced by her parents to marry against her wishes. When she knows her own mind, she makes a confidant of her grandmother, and then the young man is summoned by the father of the girl, who asks him in her presence, if he really loves his daughter, and reminds him, if he says he does, of all the duties of a husband. He then asks his daughter the same question and sets before her minutely all her duties...Then he is invited to a feast and all his relatives with him. But after the betrothal, a teepee is erected for the presents that pour in from both sides."

The wedding feast and a brief ritual constituted the marriage ceremony.

Occasionally a man and woman would live together without the "usual arrangements" (cf. Curtis 1926:84). Residence appears to have been matrilocal (Scott 1966:136:Note 35) with bilocal residence also common (Stewart 1941:405). Divorce was rare ("There was no divorce among the Paiutes." (Scott 1966:36)) although Stewart's (1941:405) informants did recognize a number of reasons for divorce among them sterility, infidelity and incompatibility. Polygyny was permitted and the sororate and levirate were not compulsory (Stewart 1941:404).

Death

Funerary customs varied and the ethnographic information details a number of variations. Extended burial in a shallow grave was the preferred method although cremation was practiced for warriors (Curtis 1926:81) and witches (Stewart 1941:412). Flexed burials were also known (Curtis 1926:81) and burial in rocks was also practiced (Stewart 1941:412) although Curtis (1926:81-82) indicates that the property was distributed among the deceased's relatives. Stewart (1941:412) notes that the personal property and house of the deceased were burned or buried. Immediate relatives cut their hair and followed a number of other rituals (cf. Stewart 1941:412). Heizer (1970b: 59) notes that the hair clippings were put into the grave with the body. There may have been a taboo on mentioning the deceased's name (Stewart 1941:412).

Scott's (1966:92) of a typical ceremony is presented below:

"The Paiutes, a nomadic tribe, traditionally buried their dead in a secret place. The body was dressed in its clothes with every ornamental trinket, necklace, and bracelet; and the deceased's loved possessions such as bows and arrows or yattahs were placed beside him. The dead person was then wrapped in his regular sleeping blankets of deer hide or animal skins... Every single article belonging to the loved one was gathered up, and what could not be buried with him was burned or otherwise destroyed. The last thing done before taking the body away for burial was to set fire to the karnee in which the person died. The Paiutes took every precaution against the spirit's returning to haunt them. Next, a place was found where the body would be safe from all predatory animals... Then, following the natural contour of the land, they dug a grave... Then they scattered the debris over the grave until not a sign was left and the surrounding ground looked as if it had never been disturbed."

No year end mourning ceremony was observed. Stewart (1941:411-413), Hopkins (1883:21,41,66,70,120), Scott (1966), Strobbridge (1899) and Curtis (1926) should be consulted for additional details.

Religion

Religion in the western sense of organized churches, sects, cults, etc., did not exist among the aboriginal ethnographic peoples of the study region. A core of native dualism did exist with Wolf viewed as a beneficent culture hero while Coyote was seen as always introducing evil. Prayers were made to both a "great spirit", identified with good, and to a person's guardian spirit (cf. Stewart 1941:414-415). Good deeds or thoughts helped nature while bad thoughts, dreams or deeds brought evil. Belief in the supernatural was expressed through vague generalized fears and hopes with personified spirits lacking (cf. Stewart 1941:414-415; DeQuille 1963:86-87; Curtis 1926; Heizer 1970a:239; Lowie 1924a:294-295).

A person was believed to have a soul (mugua) and a ghost (tsaavu). This soul is responsible for life and goes and the land of the dead at death, a place of pleasure (cf. DeQuille 1963:86-87; Curtis 1926; Lowie 1924a:294-295) while the ghost remains in the land of the living after death, visiting people and serving witches. Ghosts were especially believed to be present in whirlwinds (Stewart 1941:415). The ghosts of the dead were feared as to see one forecast misfortune of some kind (cf. Stewart 1941:415). The belief also existed that there was a place for good spirits and one for bad spirits (cf. Lowie 1924a:294-295).

A number of superstitions were undoubtedly known and practiced but they have not been recorded in the ethnographic data. Private charms were also used but information on this practice is also lacking.

Powers and Shamans

Powers came unsought in dreams, a pattern similar to that known for other Northern Paiute groups (cf. Parks 1934, 1938b). The power or spirit in a dream promised help and certain abilities to the individual. He could later be called on for assistance, if needed, through a humble request. Powers were used for doctoring, gambling (cf. Heizer 1970a:236), hunting, dancing, warfare, etc. or several things at once with the power utilized for individual rather than communal ends. Individuals' powers embraced most things in nature or belief among them the eagle, bear, otter, water-babies, rattlesnake and so on. Coyote never was a source of power even though he is a prominent character in Northern Paiute myth (Park 1938b:19). It should be noted that most powers were animatistic (rather than animistic or clear cut spirits). The list of powers given by Park (1938b:18) includes a number of distinct powers possessed by practicing Paviotso shamans. This list should be consulted by interested readers for details (cf. also Park 1938b:15-20 for a discussion of powers).

Shamans (nana pohari, moroni pohari) were primarily non-specialized doctors who could be of either sex. Doctors' power ran in families and usually the calling was semi-inherited although Stewart (1941:413) notes that a doctor's power was received in childhood. Park (1934:112) notes that the Paviotso shamans acquired their powers only at maturity. The power came in recurring dreams with the songs in the dreams gradually taking form until comprehension and recognition occurred by puberty. This development (i.e., professional shaman) came under the tutelage of an established shaman (Stewart 1941:413). The doctor's songs were considered to be his most important possession and by maturity he had a number of these. A doctor's power told him when to tell his neighbors about his songs and dreams so "They will know he is ready to doctor sick people" (Park 1934:104).

Refusal of shamanistic power was dangerous with a potential for causing great harm both to himself and others. Several rituals are mentioned by Park (1934:100) to negate the unsought for powers.

A typical treatment of a patient is described in some detail by Park (1934:104-107). Treatment of illness (or bewitchment) involved a variety of techniques including but not limited to dancing by the shaman, touching of the patient with the hands and ritual paraphernalia, sucking of the afflicted body part to remove the object causing the illness, smoking, etc. over a period of one night, although occasional cases required several nights of treatment or more than one shaman. Paviotso shamans had interpreters whose function was to make the shaman's usually unintelligible words understandable to the audience. A fee was usually charged with the fee set by the doctor's power. Failure to follow the instructions of the shaman when he was doctoring resulted in harm to both the patient and doctor (Park 1934:107). A number of specialized shamans were known, among them were weather shamans, antelope doctors, and clairvoyant shamans. These doctors were thought to be especially powerful in treating certain diseases or performing certain feats (Park 1934:107-110, 1938b).

Witches were naturally evil or resulted from misuse or improper development of doctor's powers. A witch causing death was killed (Park 1934:111, 1938b) although if found out he would be asked to remove the curse or spell causing the illness (cf. Park 1938b).

Doctors were killed not for losing their patients but because their failure to cure indicated that their power had gone bad (cf. Park 1934: 110-111). The loss of his doctoring equipment was also dangerous to the shaman (cf. Stewart 1941:413).

In general, shamans occupied an ambiguous position in the community. They were socially useful as curers, weather controllers, and prophets but they were always potentially dangerous to the community as well through the threat of witchcraft. They occupied a position of some prestige and influence and quite probably had some wealth as well. However, they were also specialists in a group of generalists and while their powers may have set them apart from the community they were still part of the community with no real special privileges apart from their influence (cf. Park 1934, 1938b).

Mythology

A moderate body of published material is available on the mythology or folklore of the Northern Paiute in general (Heizer 1970a; Hopkins 1883; Natches 1923; Lowie 1924a-b; DeQuille 1963; Fowler and Fowler 1970, 1971; Kelly 1938; Dansie 1975; Curtis 1926) and the Toe and Kupa in particular. A brief analysis of the myths indicates that they are similar in structure to those of other Great Basin groups. The stories are direct narratives with characterization subordinate to action except in the Coyote myths where the action revolves around this figure and his exploits. The action is presented by description and a skillful narrator can contribute to the characterization and action (cf. Wheat 1967).

The myths' or stories' favorite theme is magic and its application. Magic is figured in the creation of objects, is exhibited in the clashes of men who have supernatural powers and is prominent in Coyote's failures. Hunting and gambling, favored and vital activities of the Northern Paiute, often form central themes of the various myths. Coyote tales are often centered around hunting or lustful adventures or combine the two often to the enjoyment of the audience. His adventures often have sexual overtones which are related in graphic detail. War stories are very uncommon except for the myth of the Saidukah whom the Northern Paiute supposedly drove out of the Humboldt Sink in a number of battles (cf. Heizer 1970a; Hopkins 1883; Stewart 1939; Scott 1966, among others). The majority of the characters in the Northern Paiute myths are generally animals with Coyote, the trickster, being a central figure.

Steward (1936) has conducted a brief analysis of Owens Valley mythology which also applies to the Northern Paiute groups of the study area. The first category contains stories designed to "explain the origin of the earth, people, natural phenomena and culture" (Steward 1936:358). The second category, the Coyote cycle, is a series of unified tales revolving around Coyote, the

"inveterate trickster." Steward's third category, epics and miscellaneous myths, deals with stories in which plot rather than characterization dominates and often lacks narrative coherence (cf. Steward 1936:361).

Of special interest in regards to the study area, is that Job's Peak (Fig. 13) is the supposed center of the creation of the Paiute nation (cf. Shimkin and Reid 1970; Kelly 1938; Lowie 1924b:200). Lone Rock, the prominent landmark on the B-20 Range, also features in a myth.

"All the people from Carson Sink and Humboldt lake, in fact all the people from the Pine Nut mountains (Stillwater range) and all those to the west, came to fight Wolf and Coyote. It would appear that Coyote was the younger brother and was considered too young to fight, so Wolf shut him in the house while he went out to fight alone. The people stayed on one side of the basin, while Wolf fought them from the other side. He killed some of the people. They can be seen to this day as rocks, some standing and some fallen just as they were when killed across the basin from where Wolf's house is situated. The people were clothed in robes made of twisted strips of skin from the mud hen, woven together with thongs of buckskin. There were scattered about over the ground fragments of black rock, looking just like the skin of the mud hen.

Wolf himself was killed in this engagement and his head cut off. You can see his headless form and entrails all scattered about (No. 5, Plate 68; Fig. , this report). Meantime Coyote was a prisoner in the house, but he made repeated attempts to get out by climbing up through the smokehole. At last he succeeded in getting out just as Wolf was killed. When Coyote say what had happened, he fell over and rolled down the slope, pretending that he was dead, and for further deception he also made some weeds grow out of his head. He can be seen there now with the weeds, which are trees, growing around him. The house is now a cave with trees in the opening. They are the obstructions that Wolf put up to keep Coyote in (No. 4, Plate 68; Fig. , this report).

After pretending to be dead for a while, Coyote got up and chased the people. In their haste to escape the people took Wolf's head and threw it over the Pine Nut mountain. It landed on the plains north of Carson sink, a distance of 20 miles or more, and now is a rock about 200 feet high called mosi'i (No. 6, Plate 68; Fig. , this report). Coyote chased the people out of the country, brought back his brother Wolf's head, put it back upon the body and brought him to life again" (Loud and Harrington 1929:161-162).

A myth that may have some factual basis concerns the previous inhabitants of the Humboldt Sink, the Saidukah, who were driven out by the ancestors of the present Kupaokado band of Northern Paiute. Lovelock Cave, near Humboldt Lake, is said to have been the site of the last battle between the Kupa and the Saidukah. Heizer (1970a:241-242) is of the opinion that the myth may have some basis in fact and probably reflects the dispossession of one group of Paiute by the more aggressive Kupa band. Archaeological research may be



Figure 13

able to verify this "succession" of groups. Additional details and various interpretations of this story can be found in Heizer 1970a; Hopkins 1883; Scott 1966; Dansie 1975; Stewart 1939, among others).

Relations With Other Groups

Warfare

Hostilities were apparently extremely rare and intertribal relations peaceful as very little data exists concerning warfare among the pre-contact Toe and Kupa. The data that does exist (Stewart 1939; Scott 1966; Hopkins 1883, among others) refers only to the battle between the Kupa and the Saidukah (cf. Mythology, this report). Undoubtedly minor hostilities and altercations were present but no data has survived for the ethnographic record. A war dance was practiced at Fallon (Lowie 1924a) but whether or not this was introduced from another area is unknown.

Trade

Very little data exists on trade relations with either surrounding Paiute bands or outside tribes (e.g., the Washo) for pre-contact times. The presence of exotic shell beads and pendants from California (cf. Bennyhoff and Heizer 1958) is a concrete indication of trade with foreign sources. Probably little direct contact took place and the materials were obtained through successive middlemen. Northern Paiute groups on the Washo border participated in trade with the Washos receiving primarily deerskins in return for a varied range of trade goods (cf. Davis 1961:42). K. Nissen, (personal communication, 1979) believes that the study area may be an important transitional trading area between a number of groups based on her research in the area. Future research on trade relations coupled with unpublished data and collections analyses may provide information on this problem.

Summary

The aboriginal inhabitants of the study area have been identified as two Uto-Aztecan speaking Northern Paiute bands, the Toedokado and Kupadokado, occupying approximately 10,000 square miles of west-central Nevada. Pre-contact population estimates for the two bands center around 800 individuals each but there is wide disagreement on these figures. A population density for the area has been calculated at one individual per 6.4 square miles although the true density may be a good deal higher.

The Kupa and Toe bands, like other California and Nevada aboriginal groups, relied on a variety of seasonally available plant and animal species for their subsistence. Vegetal foods were obtained from the exploitation of a wide variety of seasonally available seeds, roots, greens and nuts. While pinenuts have been considered as an important staple food for these groups, there is considerable debate as to when and why they became a favored resource. Individual and communal hunting of jackrabbit, deer, antelope, mountain sheep, various waterfowl and a number of rodents contributed to the meat supply. A fishing industry, utilizing a number of capture methods, exploited the nearby lakes and rivers of both groups and their neighbors.

The basic level of the Toe and Kupa groups was the kin clique or extended family. These groups constituted the basic work unit in the system and the day-to-day interaction group for individuals. This group generally moved as a unit between the various resource areas. Their seasonal round followed a series of moves to resource areas based on the current availability of certain seeds, roots, animals and other economic subsistence items. Several researchers have theorized that the pre-contact Toe and Kupa social organization and subsistence/settlement pattern was probably characterized by permanent villages, relatively specialized subsistence patterns (lacustrine oriented) and stable social groupings in contrast to the shifting settlements, unspecialized subsistence patterns and fluid social groupings known for post-contact times. In general, the system can be viewed as an adaptation providing survival under conditions of high risk.

Village size and population data are scanty for both groups although ethnohistorical and archaeological data suggest substantial populations in certain areas. There was no recognized formal leadership system although men of personal ability and initiative often organized a variety of temporary operating groups to conduct economic, ceremonial and recreational activities, often on a large scale and sometimes at the interband level.

The two groups share a number of Northern Paiute material culture traits with varying differences. Non-material traits, birth and childhood, puberty rites, marriage and death among others are similar to neighboring groups. Of some interest are their numerous myths one of which notes the Carson Sink area as the center of the Northern Paiute creation and the other which relates the story of the formation of Lone Rock on the present B-20 Air Warfare Range.

Warfare was extremely rare with the only major battle related in a myth. An analysis of this story apparently indicates the dispossession of another group of Indians from the Humboldt Sink, the Saidukah, by the Kupadokado. Trade was carried out with the neighboring groups with buckskins and California shell beads being the main trade items.

Contemporary Native Americans

A moderate number of Native Americans belonging to the Paiute/Shoshone tribes are resident within the Carson and Humboldt Sink area. One reservation/colony (Churchill County) and one Indian Colony (Pershing County) are present within the study area with an approximate population of 767 Native Americans listed as resident or as members of these entities (U.S. Department of Commerce 1974; Gerald Allen, personal communication, 1979). The government of the Fallon Colony and Reservation, the Fallon Business Council, consists of five members elected by the tribal members for a term of two years or until they are replaced (U.S. Department of Commerce 1974). The Lovelock Colony is organized under the Indian Reorganization Act of 1934 and the governing body, the Lovelock Colony Council, is composed of five members (U.S. Department of Commerce 1974). Both groups belong to the Inter-Tribal Council of Nevada, a body organized by various Native American groups to promote and coordinate the development of Indian reservations and interests in Nevada. Both colonies maintain autonomy over their local funds, programs and other matters. The Bureau of Indian Affairs, Department of the Interior, represents the Federal

Government in relation to Native American affairs. General and specific information on the political structures relevant to and affecting Native Americans in Nevada can be found in Houghton (1973), Rusco (1973), Fay (1971) and Forbes (1967) among others.

Table 3

Fallon Colony and Reservation

Tribe: Paiute and Shoshone

Population: 650 residents (G. Allen, personal communication, 1979)

Gross Acreage: 8120 acres Established: 1906

Lovelock Colony

Tribe: Paiute

Population: 117 (as of 1970)

Gross Acreage: 20 acres Established: 1907

The contemporary Native American residents of the region have to one degree or another adapted to the social and economic conditions imposed by the white settlement and occupation of the area. Permanent or seasonal wage labor in a number of professions and occupations, by both males and females, occasionally coupled with various government benefits, provide the main form of subsistence for the majority of the Native Americans. The traditional round of hunting, gathering and collecting has almost been totally abandoned due to the pressures and necessities of White contact (cf. Shimkin and Reid 1970 for a brief discussion of acculturation). Hunting, gathering and collecting of personal quantities of plant and animal foods still continues but usually only as a supplement to the now largely Anglo diet (cf. Cook 1941 for a brief discussion of food preferences and acculturation). At present there are no known gathering sites being utilized (G. Allen, personal communication, 1979).

At present, the Native Americans (especially the members of the Fallon Colony and Reservation) do not practice any traditional behaviors or customs (interview with G. Allen, Tribal Chairperson, 1979; cf. Shimkin and Reid 1970 for another view) although there is an ever increasing awareness among both the young and old of their ethnic heritage as Native Americans. There is local concern over preserving the native Paiute language and in recording information and tribal history from the surviving tribal elders (G. Allen, personal communication, 1979). This interest can be attributed in part to their recognition that their heritage represents an asset and tie to the past as well as a foundation for future growth and enrichment of their lives within the "mainstream" of "white" America.

Contemporary Native American Concerns - Project Area

Mr. Gerald Allen, Tribal Chairperson, Fallon Indian Colony and

Reservation was interviewed by Ms. Patricia Ogrey, Basin Research Associates (October 26, 1979) regarding Native American concerns that might be applicable to the B-20 Air Warfare Range. While a number of concerns dealing with the Fallon Native American community were discussed (e.g., the expansion of the reservation boundaries, the loss of their past heritage, local water rights, etc.) no undue concern was expressed concerning the proposed project area (B-20) and its expansion. Mr. Allen indicated, on the basis of his personal knowledge, that he knew of no one who had even mentioned the area as significant (i.e., archaeologically or historically) in any way (for other data, see Ethnographic Overview, Mythology). Mr. Allen was knowledgeable about the various archaeological sites within the Fallon area and volunteered additional information concerning a number of previously known sites. As well, he pointed out the general location of supposed Native American burial areas. None of these is within or in the immediate vicinity of the B-20 range or its proposed extended boundaries.



ARCHAEOLOGICAL OVERVIEW

A History of Archaeological Research in the Humboldt and Carson Sinks, West-Central Nevada.

The research potential of the Carson and Humboldt Sink region to the study of regional prehistory has been amply demonstrated by the considerable number of archaeological investigations that have taken place in this area of west-central Nevada since the turn of the twentieth century. Early exploration journals and military reports for the initial contact period contain both anthropological and archaeological observations of limited utility for the area (Leonard 1904; Kern 1876; Simpson 1876; Boothby 1888; McGee 1889; Fremont 1845; Remy and Brenchley 1861; Russell 1885; Mallory 1886; War of Rebellion Records, various; Bureau of Indian Affairs Reports, various; cf. Cline 1963, among many others). The first serious archaeological investigation of record, and the first significant excavation within the Great Basin, was the excavation of Lovelock Cave (NV-Ch-18), Churchill County, by L.L. Loud, an employee of the Museum of Anthropology, University of California, Berkeley, in 1912 (Fig. 14).

"Loud was wholly lacking in training, and his work was nothing more than careful collecting. Kroeber, under whom Loud worked as a museum guard, gave Loud no specific instructions on how to excavate or what information to record, probably for the reason that 60 years ago in the United States, archaeology was essentially a methodless exercise in collecting prehistoric materials. The closest Loud came to following any technique was in mapping the cave floor and delimiting small areas which he called 'lots', the material from each numbered lot being kept together. No depth record of finds was made. Loud simply dug with the aim of finding as much as he could (Heizer and Hester 1978:147-148)."

Loud's salvage excavations at Lovelock Cave (done after extensive guano mining of the site, cf. Heizer and Napton 1970a) and his observations on the Humboldt Valley (Loud and Harrington 1929) marked the beginning of the University of California's interest in west-central Nevada. His investigations in 1912 and again in 1924 in conjunction with M.R. Harrington of the Museum of the American Indian, Heye Foundation (cf. Harrington 1925, 1941) resulted in a significant monograph being published in 1929 (Loud and Harrington 1929) and several small papers and brief notes (cf. Harrington 1925:82-83, 1927:40-47, 1932:123-124, 1941:4-6; Gifford 1926:382; Barber 1928:32-33, 88-89; Orchard 1925; Weltfish 1930, 1932a,b, 1953; and Setzler 1935). In addition to the detailed monograph on the two excavations, the report included several appendices dealing with the archaeology and ethnography of the Humboldt Valley. A number of the prehistoric sites initially described by Loud and Harrington (cf. Harrington 1927, 1932) were investigated by later researchers (cf. Gifford 1926:382; Cowan and Clewlow 1968: 195-236; Heizer and Krieger 1956; Heizer 1951a; Hester and Busby 1977; among many others), although the site of Ocala Cave, 10 miles west of

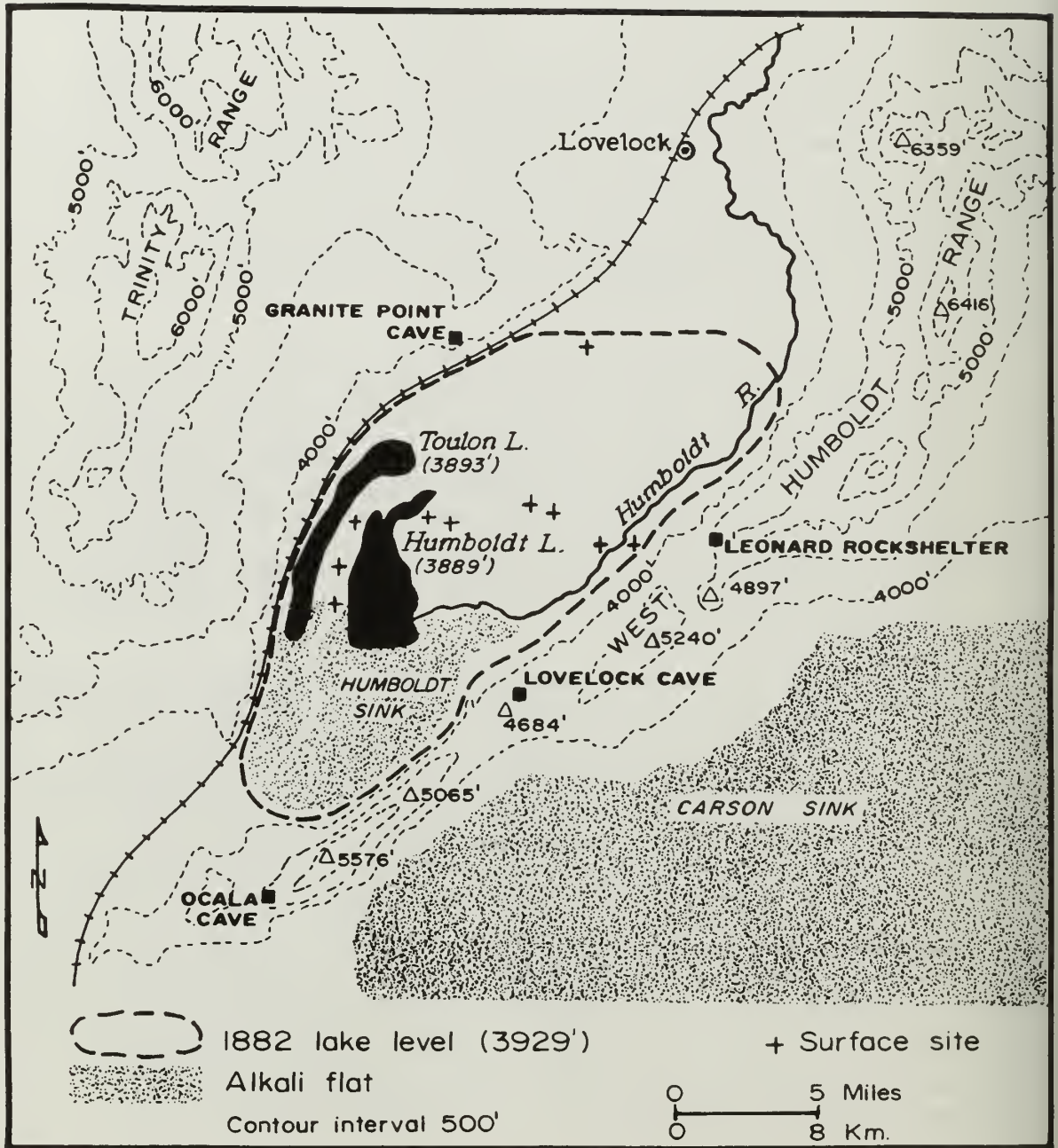


Figure 14: Archaeological Sites in the Humboldt Sink Region, Nevada.

Lovelock Cave (NV-Ch-18), excavated by the Loud and Harrington expedition of 1924, still remains largely unanalyzed and unreported to the archaeological community.

The major accomplishment of Loud and Harrington was their controlled test of the deep deposits located in the west end of the cave. Their interpretation of the stratigraphy resulted in the definition of a Later Period, Transitional Period and Older Period (Late Lovelock, Transitional Lovelock and Early Lovelock) chronological scheme based in part on depth and artifact types. A critical re-assessment of Loud and Harrington's (1929) interpretations is presented in Heizer and Napton (1970a).

In 1929, Julian Steward made note of the petroglyphs at Grimes point, in the Carson Sink (Steward 1929).

The 1930s saw only one major excavation in the Humboldt Sink along with a number of brief visits, surveys and collections within the region (R.F. Heizer, personal communication, 1978). Humboldt Cave (NV-Ch-35), initially discovered by L.L. Loud (Loud #15) in 1912, was excavated by a small crew under the direction of R.F. Heizer and A.D. Krieger in 1936 although publication of the site report was delayed until 1956 (Heizer and Krieger 1956). Humboldt Cave was an occupation and cache cave which yielded a large variety of material culture items (cf. Heizer 1951c). There was no natural stratification in the cave and the chronology is based primarily on comparisons with the nearby Lovelock Cave materials and a number of radiocarbon dates (Heizer 1956:51). Aboriginal occupation of the site began about 3 B.C. and continued intermittently through Transitional and Late Lovelock times. Historic Northern Paiute usage was also noted. Projectile points are primarily of the Eastgate and Rose Spring series (Heizer and Krieger 1956:Plate 14a-k) although several larger, stemmed points are also present. Basketry types include Lovelock Wicker and Catlow Twined. Additional data on the site and the 5200 specimens recovered can be found in Heizer and Krieger (1956) (cf. also Heizer 1951c:247-252; O'Neale 1947; Baumhoff and Heizer 1958). The first major surface collection of NV-Ch-15, the Humboldt Lakebed site, was also accomplished by the 1936 field party although partial publication of the results of this research did not occur until 1968 (Heizer and Clewlow 1968).

Nels Nelson, sponsored by the American Museum of Natural History, made a small, surface collection from relic hunters' backdirt at Lovelock Cave in 1936 (cf. Grosscup 1960:2) and R.F. Heizer and A.D. Krieger visited Lovelock Cave and Leonard Rockshelter (cf. Heizer 1938:68-71; 1967b:49-52; and Heizer and Krieger 1956) the same year. A brief visit was made to the Grimes Point area and southern area of Carson Lake in 1937 by R.F. Heizer (personal communication, 1977). In 1937, Heizer also test excavated Granite Point Shelter (NV-Pe-41) but the results were not published for some 30 years (cf. Roust 1966). In 1939, a private collector donated fish nets found in Hidden Cave to the University of California and these were later studied by Ambro (1966). Concurrent with the archaeological research was the ethnographic salvage program by the University of California, Berkeley under the direction of Professor A.L. Kroeber (cf. Fowler 1977, Baumhoff 1958a). A

number of these Culture Element Distribution studies sponsored by the University proved to be valuable aids in archaeological interpretation (e.g. Steward 1938; Stewart 1939, 1941) for the study area.

Archaeological and anthropological research in west-central Nevada was largely suspended during the Second World War and the years following its termination. However, S.M. Wheeler and his wife, Georgia, under the auspices of the Nevada State Parks Commission investigated the Grimes Point area during 1939-1942. Both Fish Cave (NV-Ch-19) and Spirit Cave (NV-Ch-21) were tested and a burial was recovered from each along with two cremations from Spirit Cave (Wheeler and Wheeler 1969). The Wheelers excavated Hidden Cave (NV-Ch-16) as well. J. Harrington (1947) briefly mentions Hidden Cave and Spirit Caves. In addition to their test excavations, the Wheelers also mapped the area indicating the location of a number of caves and rock-shelters (B. Hatoff, personal communication, 1979) and noted 24 additional sites (cf. Botti 1977). Lovelock Cave was visited by R.F. Heizer and J. Mills during 1949 in order to obtain a number of organic samples to be used in the new radiocarbon dating technique then under development at the University of Chicago (cf. Heizer 1956:56-57; and Cressman 1956:311-312). The site of Leonard Rockshelter (NV-Pe-14) was also visited and plans were made for its excavation the following year.

After a long lapse due to the second World War, archaeological research resumed in the Humboldt and Carson Sinks. With a new generation of students, Robert Heizer of the University of California, Berkeley, Archaeological Survey initiated a major survey and excavation program in the study region. In the 1950s and 1960s significant theoretical and the methodological advancements directly resulted from this program, including the refinement of exact chronologies; the definition and testing of the lacustrine-based lifeway; determination of the relationships between changing post-glacial climate and regional occupation and culture change; and discovery of the function of prehistoric rock art.

In 1950, Robert Heizer, Ernst Antevs, Norman Roust and a group of students excavated Leonard Rockshelter (NV-Pe-14) (cf. Heizer 1951a:89-98); Granite Point Cave (NV-Pe-12) (cf. Roust 1966:37-72); NV-Pe-8 ('Cache Cave') (cf. Baumhoff 1958a:14-25), and secured from Lovelock Cave (NV-Ch-18) a grab sample of coprolites (cf. Heizer and Krieger 1956:33; Heizer 1967b:50; and analysis by Roust 1967:49-88). A site survey and petroglyph survey of the lower Humboldt Valley was conducted and the Humboldt Lakebed Site (NV-Ch-15), visited by Loud (Loud and Harrington 1929) was partially collected (cf. Heizer and Clewlow 1968:59-88).

Leonard Rockshelter, named after Zenas Leonard of the 1833 Walker expedition (cf. Leonard 1904), yielded a long culture sequence - a sequence upon which most culture chronological correlations in the Humboldt Sink area have since been made. The earliest cultural remains (not represented at the site) were hypothesized to be a basalt core - heavy flake tool complex from the 3950 foot shoreline of Lake Lahontan. Further work has not substan-

tiated this hypothesis and it has since been discarded (cf. Hester 1973:91). As illustrated in Fig. 15, Heizer (1951a) placed the Humboldt Culture between ca. 6000 B.C. and 5000 B.C. Reported radiocarbon dates for this early occupation are 5088 B.C. (C-298) and 6710 B.C. (C-281). In the middle of the Leonard Rockshelter sequence is the Leonard Culture, thought to indicate Altithermal occupation of the Humboldt Sink. From the end of the Leonard Culture (ca. 2500 B.C. ?) to the beginning of the Lovelock Culture deposits (ca. 500 B.C. ?) there is a hiatus in the occupation at the site (cf. Fig. 15). The excavations at the Leonard Rockshelter were of great importance in that Antevs obtained radiocarbon dated archaeological evidence to support his theory of post-glacial climatic change (cf. Antevs 1948). Antevs (1948, 1953, 1955) divided the post-glacial period (Neothermal) into the early Anathermal, followed by the Altithermal ('Long Drought') and then by the Medithermal. The strong correlation of Leonard Rockshelter's stratigraphy to Antevs' model stimulated further interest in the relationship of climatic change and its effect on human cultural adaptations. Granite Point Cave yielded Late Prehistoric material including a Desert Side-Notched projectile point and Lovelock Wicker basketry (cf. Roust 1966:37-72). NV-Pe-8 yielded a Cottonwood Triangular point and both Lovelock Wicker and Catlow Twined basketry (Baumhoff 1958a:14-25).

In 1951, Gordon Grosscup, Norman Roust, Roger Morrison (United States Geological Survey) and other students from the University of California, Berkeley, conducted a site survey of the Carson Desert Area (cf. Grosscup and Roust 1952) and excavated Hidden Cave (NV-Ch-16) (cf. Grosscup 1956: 58-64; Roust and Grosscup 1957; and Morrison 1964).

The first published results of the Hidden Cave excavation appeared in 1956 in a short article by Grosscup (1956) detailing the Carson Sink culture chronology based on site survey information and the Hidden Cave deposits. The earliest period (Fig. 16) represented by surface artifacts from Hathaway Beach (NV-Ch-61) and the associated quarry (NV-Ch-68), have been called the Fallon Phase by Grosscup (now assigned by Hester (1973) to the Western Pluvial Lakes Tradition). The cultural remains found in the Mud Flow Gravels which form the basal Hidden Cave deposits were thought to correspond to the Anathermal and to Morrison's (1964) Late Sehoo Lake. This Hidden Phase is characterized by Humboldt Concave Base - A projectile points. Grosscup's Carson Phase lies in Aeolian Silts at Hidden Cave and has been placed in the Altithermal time period. The wind blown silts probably correspond to the Altithermal Age Turupah Formation and Toyeh soils (cf. Morrison 1964). Pinto Square Shoulder points were found in these deposits. In the deep 32" Midden deposit, Grosscup found materials attributable to the Lovelock Culture. Roust and Clewlow (1968) report that three Humboldt Concave Base - A, three Elko Eared, one Elko Corner-Notched points were found in this stratum. Morrison (1964:87) correlates this stratum with his Fallon Formation of Medithermal times. Morrison (1964) and Grosscup (1956) suggest that sparse habitation occurs during the time of the higher or earlier Fallon Lake due to the relative paucity of artifacts in the Hidden Cave 32" Midden. Morrison and Grosscup further suggest that after the high Fallon Lake receded, only limited shoreline habitation occurred. The second Fallon Lake was thought by Grosscup and Morrison to be a period of climax

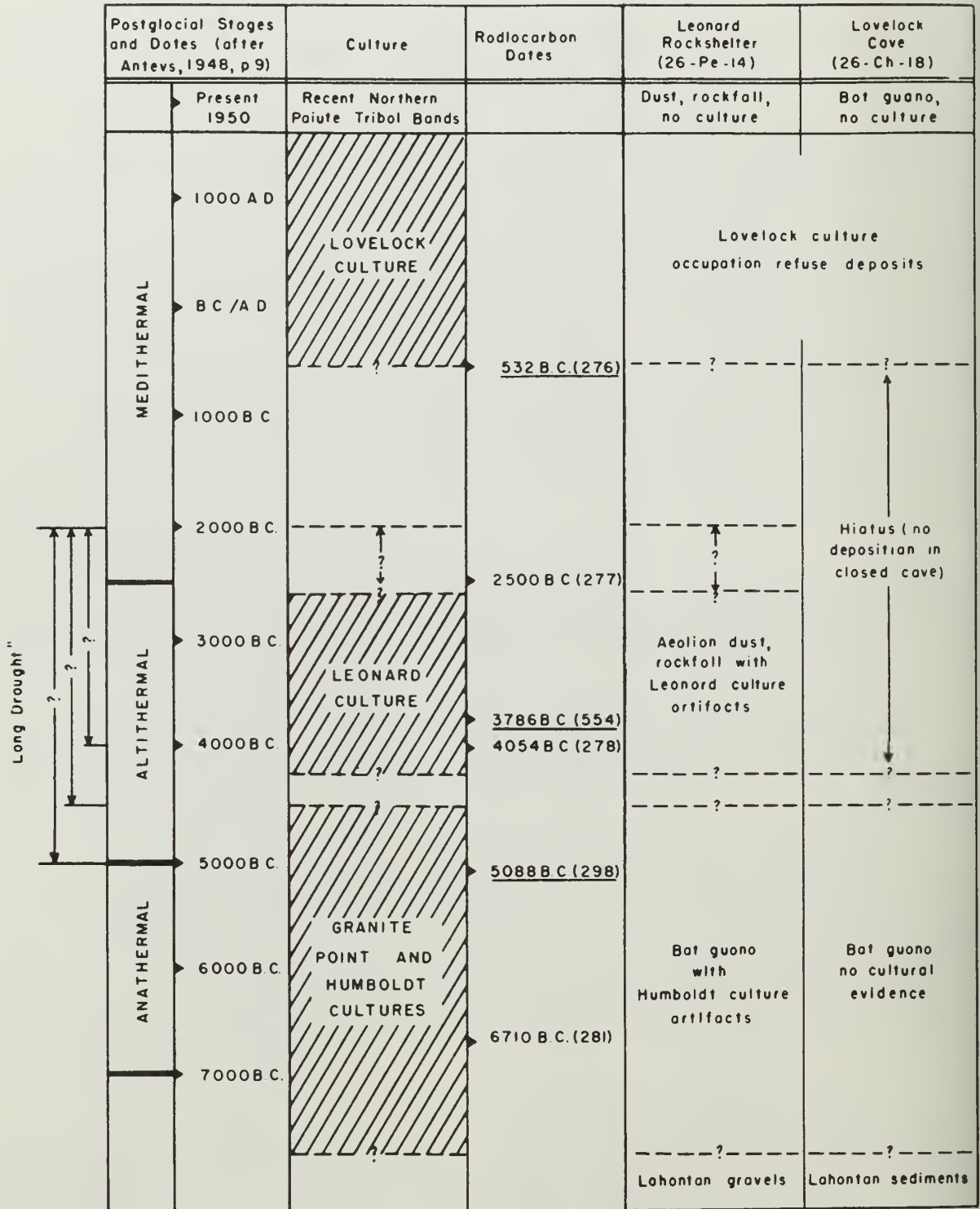


Figure 15: Culture Chronology of the Humboldt Sink Area, 1951 (From Heizer 1951a).

Geological Period	Schematic Stratigraphic Section in Hidden Cave
Medithermal	Surface
	Silt
	Top Midden (Lovelock Phase)
	Silts
	32" Midden (Lovelock Phase)
Altithermal	Silts (Carson Phase)
	<u>Volcanic Ash</u>
Anathermal and Upsal?	Mud flow, bat guano, etc. (Hidden Cave Phase)
Lahontan III	Lake Gravel
	Lime
	Sand
	Clay
	Sand and mud flow
Lahontan II	Clay
Lahontan I	Bedrock (Cemented gravels)

Figure 16: Correlation of Geological Periods and Stratigraphy in Hidden Cave (From Grosscup 1956).

habitation, based again, on Hidden Cave deposits (top midden - Late Lovelock Culture). After the second Fallon Lake receded, the population declined. Grosscup's (1956) Lovelock Phase includes both the Early and Late Lovelock Culture. The Dune Spring Phase, the most recent of Grosscup's Carson Sink cultural phases, is thought to represent the ethnographic Northern Paiute who occupied open sites in the surrounding lakeshore dunes. Morrison (1964:105) notes that, "the density of occupation seems to have fluctuated with lake levels; being greatest when the lakes were highest and least when they were dessicated, although sparse temporary occupation may have persisted along the Carson River and perennial springs through some of the dry intervals."

In 1954 a small field party from the University of California, Berkeley made a surface collection from NV-Pe-5, an open occupation and workshop site (cf. Elsasser 1958 and Cowan and Clewlow 1968) and Gordon Grosscup (1974) prepared a comprehensive report on Northern Paiute archaeology for the Indian Land Claims Commission as part of the plaintiff's exhibits.

By 1956, additional radiocarbon dates were available for Lovelock Cave (cf. Heizer 1956 and Cressman 1956:312). Heizer (1956) and Grosscup (1956) published trial chronological schemes for the Humboldt and Carson Sinks and synthesized all available data from the previous excavations and collections. Research carried out in the early to mid 1950s resulted in the definition of regional culture chronology and the establishment of post-glacial climatic change as an influence on human occupation of the Humboldt and Carson basins. Especially useful was Heizer's (1956:96) cultural sequence for the Humboldt Sink region (Fig. 17).

The evidence presented by Heizer (1951a, 1956), Grosscup (1956), Roust and Grosscup (1957) and Morrison (1964) that human occupation may have ceased (or was extremely sparse) during the Altithermal (or was affected by climatic change at all) stood in marked contrast to ideas then being advanced by Jennings (1953), and Jennings and Norbeck (1955). Jennings' (1953) 'Desert Culture' hypothesis viewed human adaptation as remaining fairly constant over the past 8-10,000 years with climatic change having minimal impact on the already well adapted human populations. Jennings (1957) objected to Antevs' (1948, 1952, 1955) scheme because it did not agree with the Danger Cave radiocarbon dates. Jennings (1957) emphasized the unchanging character of Great Basin culture since Pleistocene times and minimized the changing consequences of ecologic conditions (Baumhoff and Heizer 1965:698). Later, Jennings (1964:152) recognized both a dry desert adaptation and a lake margin adaptation, both being quite ancient (cf. Heizer and Hester 1978:152). However, he also totally rejected Antevs' post-glacial climatic scheme. Baumhoff and Heizer (1965:699-700) supported the Antevs model and stated that based on Carson and Humboldt Sink archaeology, there was a marked contrast between artifacts before and after ca. 2500 B.C. Not only are artifacts in the period beginning 2500 B.C. different, but they are also much more numerous and there are many more occupied cave and open sites. Baumhoff and Heizer (1965:700-702) see, "abundant cultural evidence for improvement in climatic-

Pleistocene and Postglacial Stages		Cultures		Radiocarbon Dates	Leonard Rockshelter	Lovelock Cave	Humboldt Cave
GLACIAL		1950 AD	Recent N. Paiute		Postoccupation dust, rockfall	Postoccupation bat guano	Historic Paiute
	Medithermal	1000 AD	LOVELOCK CULTURE	268 AD	LOVELOCK CULTURE OCCUPATION DEBRIS		
		BC/AD		2 BC			
		1000 BC		532 BC			
				1218 BC			
	Altithermal	2000 BC	LEONARD CULTURE	2500 BC	Aeolian dust deposited in Long Drought of Middle Postglacial with Leonard Culture artifacts	Bat guano No occupation by man	No occupation by man
		3000 BC		3786 BC			
		4000 BC		4054 BC			
	Anathermal	5000 BC	GRANITE POINT and HUMBOLDT CULTURES	5088 BC	Bat guano with Humboldt Culture artifacts		
		6000 BC		6710 BC			
	Late Pleistocene	7000 BC					
		8000 BC					
		9000 BC		9249 BC		Lake Lahontan silts	Lake Lahontan gravels and silts
					Lake Lahontan gravels and sand		

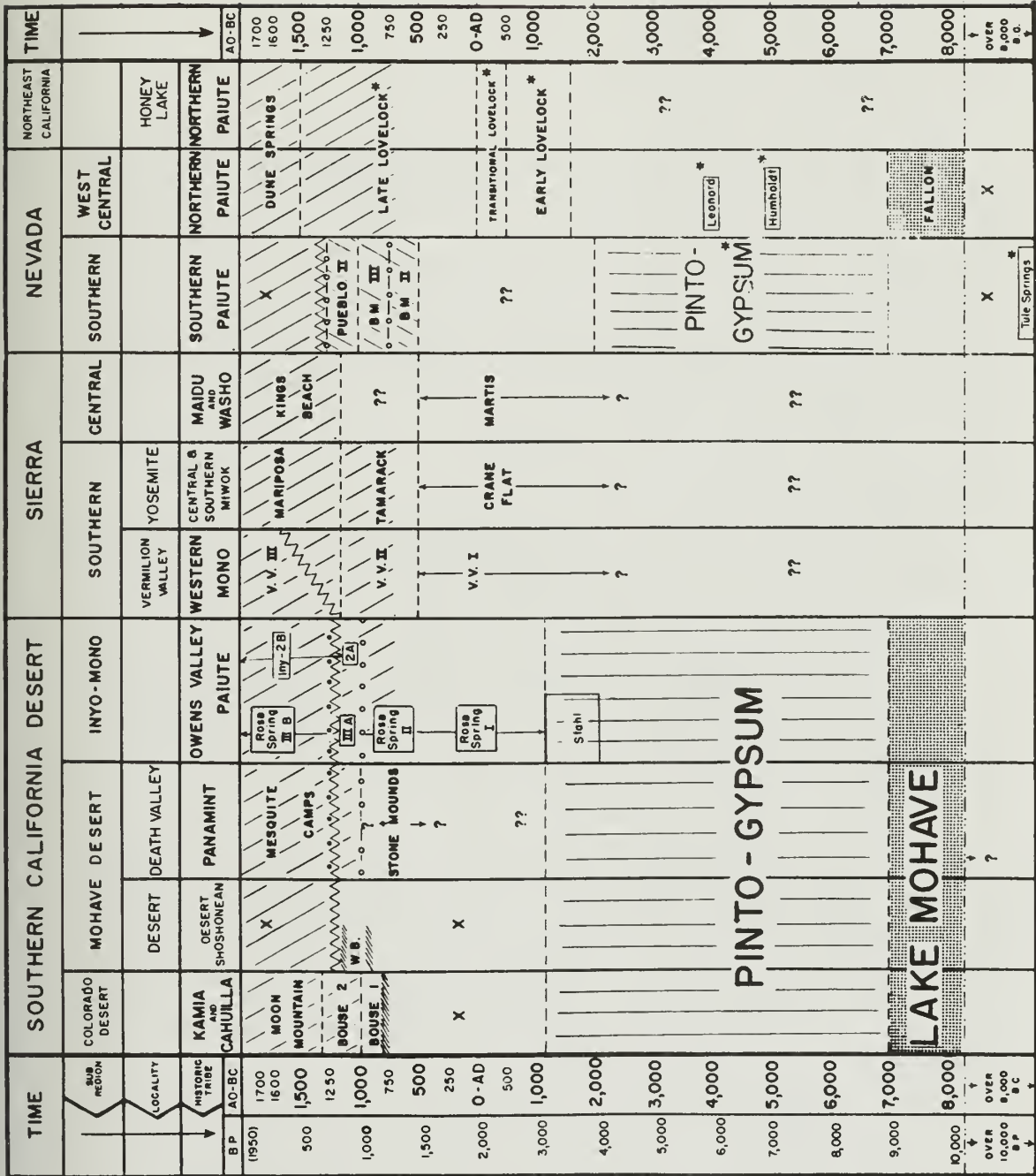
* After Antevs, 1948.

Figure 17: Culture Chronology of the Humboldt Sink Area, 1956 (From Heizer 1956).

biotic conditions after the Altithermal" which may be attributed to "a rebirth of Humboldt Lake as a result of lowered temperatures and increased moisture." Jennings (1964:153) spoke of "a stable, successful adjustment to a special environment characterized by chronically deficient moisture." Baumhoff and Heizer (1965:703) noted that "nearly all of the ancient archaeological sites in the Great Basin are in caves on the borders of lakes of the Bonneville and Lahontan basins; hence the fundamental ecological adjustment of Early Man in the Great Basin can be seen as oriented toward water rather than the waterless desert as emphasized by Jennings." Recent palynological evidence from Leonard Rockshelter (cf. Byrne, Busby and Heizer, in press) confirms the Antevs (1948, 1953, 1955) model as being valid for the study region.

With the publication of the 1935 excavations of Humboldt Cave in 1956, Heizer and Krieger (1956) took the opportunity to suggest that a lacustrine or lake-side adaptation could be verified with the available archaeological evidence from the Humboldt Sink region. Future work in the study area would focus on the "lacustrine adaptation." Heizer and Krieger (1956) also discussed the importance of open occupation sites in the regional settlement pattern. Field research in 1956 was limited with only a small field party from the University of California, Berkeley, dispatched to excavate burial pits and collect radiocarbon samples from the Humboldt Lakebed Site (NV-Ch-15) (cf. Heizer and Napton 1970a:46).

In 1957, Gordon Grosscup (1957a) published a bibliography of Nevada archaeology and a (1957b) note on research associated with Lovelock Cave. The following year, Grosscup (1958) published a compendium of radiocarbon dates from Nevada of archaeological interest. As well, a number of important publications were issued in 1958 including a valuable study of cross-dating Great Basin sites by recovered Californian shell beads (Bennyhoff and Heizer 1958, and Tuohy 1970a); a study of coiled basketry from western Nevada caves and their culture chronological significance (cf. Baumhoff and Heizer 1958); an essay on prehistoric Great Basin climates and their effect on man (Aschmann 1958); and a trial culture chronology based on all available evidence from both Humboldt and Carson sink archaeological sites (cf. Bennyhoff 1958) (see Fig. 18). Although field parties from the University of California, Berkeley had been recording prehistoric rock art sites since the 1930's, (cf. Steward 1929) 1958 marked a year of increased interest in Great Basin petroglyphs and pictographs. In the years 1958 and 1959, Robert Heizer, Martin Baumhoff, and Albert Elsasser among others, surveyed Nevada and eastern California for rock art sites, paying particular attention to any environmental and micro-geographic variables in site location. Heizer and Baumhoff (1959, 1962) were able to determine that the majority of western Great Basin petroglyphs were associated with food procurement. More specifically, Heizer and Baumhoff (1962) demonstrated that petroglyph making was part of ritualized game hunting magic. Hence, petroglyphs were found not to be aimless doodling, but rather were important elements in the subsistence economy of prehistoric Great Basin peoples and further, that their subsistence procurement regime had strong ritual components.



In the late 1950s, Phil Orr and W. Davis conducted some excavations at the Grimes Point area caves but no publication has resulted from their work except for a brief paper by W. Davis (1965) on recovered cordage. Grosscup studied the Lovelock Cave collections at the Museum of the American Indian, Heye Foundation in 1959 and 1960.

In 1960, Grosscup published his Culture History of Lovelock Cave, wherein he concluded that Lovelock Cave had been abandoned ca. A.D. 900 and that an occupational hiatus of some 800 years duration occurred between the departure of the prehistoric Lovelock population and the arrival in the area of the Numic-speaking Northern Paiute. This postulate is stated many times by Grosscup (1960:5,6,12,60,65,66) and is the principal theme of a later article (cf. Grosscup 1963:67-71). Grosscup (1960) assigned Early Lovelock to a period between 2000 - 1000 B.C., Transitional Lovelock to a period between 1000 B.C. to 1 B.C., and Late Lovelock from 1 B.C. to A.D. 900. The "occupational hiatus" theory has been discussed by Napton (1969:28-97) and Heizer and Napton (1970a:11) who believe that there is no demonstrable hiatus, either cultural or chronological, between the Lovelock Cave populations and the Northern Paiute of the Historic Period. Heizer and Napton (1970a:11) state,

"The problem of the putative linguistic discontinuities in the Great Basin during this period continues to be a matter for speculation (see Lamb 1958:95-100, Taylor 1961:71-81, Swadesh 1964:527-556; Miller 1966:75-112, and Goss 1968:1-42). The latter has summarized the major arguments advanced by the principal protagonists in the dusty arena of Great Basin lexiostatistics. Unfortunately, linguistic problems do not lend themselves to solution by archaeological investigation, no matter how detailed. The linguists have formulated a very interesting problem, and they must shoulder the burden of devising tests for its solution."

From 1960 to 1965 archaeological work in the study area was curtailed as interest was shifted to other areas of the Great Basin (cf. Elsasser and Prince 1961; Heizer and Baumhoff 1961; Smith and Elsasser 1962; and Heizer, Baumhoff, and Clewlow 1968). Tuohy (1963) reported on his 1962 survey for the Nevada Northern natural gas pipeline, which passes along the western edge of the study area. His survey is perhaps one of the first major 'other-directed' cultural resource studies in Nevada, but the information generated is of limited utility in reference to the study area. This period also saw sporadic, but growing interest in Early Man and early lithic industries. Between 1960 and 1964, researchers connected with the Nevada State Museum collected and later excavated the Cocanour site (26Ch159) (cf. Stanley, Page and Shutler 1970). The Cocanour localities are thought to possibly belong to the Western Pluvial Lakes Tradition (cf. Tuohy 1968a, 1969b, 1970b; and Bard, Findlay and Busby 1979). The widespread surface occurrence of fluted points in Nevada, (cf. Campbell and Campbell 1940; Shutler and Shutler 1959; Clewlow 1968a; Tuohy 1968a,b, 1969b; and Davis and Shutler 1969) present putative evidence that Early Man was present in the Great Basin (Heizer and Hester 1978:152). However, there is some doubt if an actual big game hunting mode of life was carried out around

10,000 - 8,000 B.C. in the Great Basin. The presumed hunting of megafauna in the Great Basin (cr. Cressman 1966; Meighan 1959:51-53; Tuohy 1968b) rests at this time, upon no concrete evidence at all (cf. Graham and Heizer 1967 and Heizer and Baumhoff 1970). Ages of 7,000 - 10,000 years have been suggested and can be accepted for working purposes, but only the discovery of a camp, occupation, or kill site in definite association with fluted points will likely settle the issue. Heizer and Baumhoff (1970) and Jennings and Norbeck (1955:2) suggest that big game animals were already extinct when man first occupied the Great Basin. Krieger (1964) and Jennings (1966) have summarized the available evidence on the subject.

The pursuit of an explanative model based on ecological interpretation was the main problem orientation of researchers in the period 1965-1970 (and beyond). The greatest accomplishment of this period was the explicit formulation of a lacustrine subsistence/settlement pattern hypothesis and its testing and confirmation through a host of specialized interdisciplinary studies.

In 1965, Robert Heizer and a new generation of graduate students collected hundreds of coprolites from Lovelock Cave. Coprolite analyses resulting from this project are reported by Heizer (1967a:1-20, 1967b:49-52); Ambro (1967:33-47); Cowan (1967:21-35); Follett (1967:93-116); Tubbs and Berger (1967:89-98 - radiocarbon dates); and Roust (1967:49-88). Coprolite analyses from Humboldt Cave, Hidden Cave, Granite Point Rockshelter and NV-Pe-8 are reported by Roust (1967:49-88). These coprolite analyses and those reported shortly thereafter by Heizer and Napton (1969:563-568); Napton and Heizer (1969:i-v); Napton (1969:28-97) and Heizer (1969b:244-250) revealed firm evidence for a widespread and extensive utilization of lacustrine floral and faunal food and other resources. Specialized paleobiological analyses (cf. Follett 1967:93-116; Douglas 1969:1-8; Napton and Brunetti 1969:9-18; and Napton and Kelso 1969:19-27) served to confirm the coprolitic evidence. A Lovelock Cave recovered grasshopper effigy was also scientifically analyzed (Jones, Weaver and Stross 1967:123-128). Backdirt left over from the 1911 guano miners was screened and recovered projectile points were described by Clewlow (1968b:89-101) and Clewlow and Napton (1970:64-72). The Humboldt Lakebed site was extensively collected by the 1965 field party (cf. Heizer and Clewlow 1968:59-88; and Cowan and Clewlow 1968:195-236). As well, ten house pits were excavated at NV-Pe-67, an open occupation site dated between A.D. 600 and the protohistoric period (cf. Cowan and Clewlow 1968:195-236).

In 1966, Roust (1966:37-72) published a site report on the Granite Point Rockshelter and Ambro (1966:101-135) published his analysis of the Hidden Cave fishnets. D. R. Tuohy (1969a) of the Nevada State Museum carried out test excavations of Hanging Rock Cave, near Grimes Point in the same year. Tuohy (1969a:47) concluded that "the cultural picture that emerges from the excavation of Hanging Rock Cave is not one of continuous occupation throughout millenia by successive groups of people, but rather one of sporadic, discontinuous occupation and utilization throughout millenia by people of a Lovelock Culture type."

Nineteen sixty-seven saw the publication of several coprolite studies (cf. Ambro 1967:37-47; Roust 1967:49-88) and re-analyses of the Hidden Cave projectile points with special emphasis on their chronological significance to the Hidden Cave culture sequence (cf. Clewlow 1967:141-149; O'Connell 1967:129-140; and Roust and Clewlow 1968:103-115).

Lovelock Cave was extensively excavated in 1968 and 1969 by parties from the University of California, Berkeley, led by Robert Heizer and Lewis Napton (cf. Heizer and Napton 1970a:1-88 and Napton 1970). Studies resulting from this project include a report on Lovelock Cave human skeletal remains (cf. Morbeck 1970:191-197), bead-stringing (Carroll 1970:39-43); analysis of a recovered basket-makers' kit (Ambro 1970:73-79) and other specialized studies (cf. Follett 1970:163-175, Dunn and Watkins 1970:176-185 and Radovsky 1970:186-199). A summary of all the available Lovelock Cave coprolite analyses is presented by Napton and Heizer (1970:87-130). Also of interest, is the published correspondence by Loud, Kroeber, Harrington and others, regarding the 1912 and 1924 Lovelock Cave expeditions (cf. Heizer and Napton 1970b:131-162). Again, in 1969, the guano miners' backdirt pile was reworked with some success (cf. Clewlow and Napton 1970:64-72). As well, NV-Ch-15 was extensively mapped, collected and excavated (cf. Heizer 1969a:3-4; Heizer and Napton 1970a:46; and Hester and Busby 1977:1). P. Hallinan, after an absence from graduate studies at U. C. Berkeley, is now preparing his dissertation based on materials from the Humboldt Lakebed site. In 1970, Hester (1970:44-54) published a wear pattern study of Humboldt and Lovelock Cave bifaces.

A major accomplishment of the 1968/1969 Lovelock project, aside from the final exposition of the lacustrine subsistence/settlement pattern in the study region (cf. Napton 1969:28-97, 1970), was a final reconstruction of the Lovelock Cave culture history and the dating of the Lovelock Culture (cf. Heizer and Napton 1970a:1-88). Heizer and Napton (1970a:38) state that Lovelock Cave was occupied by bats at a date coinciding with the estimated end of the Altithermal (Antevs 1948, 1955) perhaps as a direct result of the rejuvenation of Humboldt Lake. The initial buildup of the older bat guano layer may have begun ca. 5000 B.C. The earliest, although intermittent, evidence of human occupation is in the Older Guano layer at ca. 2700 B.C. Bats and other creatures continued to inhabit the cave until about 2500 B.C. when human occupation began ca. 1500 B.C. Heizer and Napton (1970a) note that an inhumation at the Humboldt Lakebed site has been dated at 733 B.C. $\pm$ 250 (M-649) indicating contemporaneous use of Lovelock Cave and the nearby open sites.

Human occupation of the cave and lakeside sites probably coincided with the oscillations of Humboldt Lake. Intensive occupation of the cave began ca. 1500 B.C. and continued until about A.D. 500. Due to a massive rockfall (ca. A.D. 440 $\pm$ 90) access to the interior of the cave was greatly impeded, but it continued to be utilized as a repository for the dead and for cache purposes. According to Heizer and Napton (1970a:41), human occupation of the interior of the cave was drastically curtailed, and this, together with the reduced illumination and air circulation made it more attractive to bats.

Thus, between A.D. 700 and A.D. 1911, a thick deposit of bat guano accumulated over the cultural deposits. Human occupation of the outer shelter and use of the inner cave probably continued until 1829. The 1833 slaughter of Humboldt Lake area Indians by Walker's expedition (cf. Historical Overview, this report) probably ended use of the Humboldt Valley as later travelers reported the presence of few or no Indians for a number of years. It should be noted that Grosscup's (1960) hypothesis that Lovelock Cave was abandoned ca. A.D. 900 has since been discarded due to the recovery of Desert Side-Notched, Rose Spring Corner-Notched and Cottonwood Triangular projectile points in the guano miners' backdirt (cf. Clewlow 1968:89-101). These points are all indicative of very late occupation in the Great Basin (cf. Heizer and Hester 1978).

Academic research or pure 'non-directed' research fades from interest in the 1970s with a few notable exceptions. Applied research or 'other directed studies' primarily concerned with environmental impact assessments and/or cultural resource management dominate the bulk of archaeological research within the study area.

The single most important development of this decade in regards to regional archaeology has been the advent of 'other-directed' research primarily concerned with proposed project impacts on cultural resources. Since the passage of the National Environmental Policy Act (NEPA) in 1968 and other significant cultural resources legislation (the Reservoir Salvage Act of 1960, as amended; the National Historic Preservation Act of 1966, as amended; Executive Order 11593; and the Federal Land Policy and Management Act of 1976), a great deal of 'other-directed' research has been commissioned by agencies of the federal and state governments in order to fulfill their obligations under these laws. A combination of unfavorable economic factors has seriously curtailed the traditional funding of archaeological research by educational institutions and public and private philanthropic foundations while the amount of funding available for 'other-directed' archaeological research has greatly increased. Today, the majority of archaeological and historical research in the study area is funded by such agencies as the Bureau of Land Management, the Department of Defense, and numerous private natural resource exploration/development firms.

However, significant non-directed or academic research continues to be conducted in this region by a number of researchers, although at a reduced level. The University of California, Berkeley sponsored a student research and training project in the Carson Sink in 1971. Napton (1971a,b) excavated and re-excavated a number of important sites such as Burnt Cave, Fish Cave and Picnic Cave in order to find confirmatory evidence of a lacustrine adapted lifeway amongst the prehistoric population of the Carson Sink (cf. Napton 1969, Heizer and Napton 1970a). In many respects, this lacustrine lifeway had previously been confirmed by Ambro (1966, 1967), Cowan (1967) and Roust (1967) who had reported on their analysis of the Lovelock, Ocala and Hidden Cave coprolites and by Tuohy (1969a) in his test excavations at Hanging Rock Cave. Napton (1969, 1970), and others had already confirmed, through the analysis of coprolites and other biological specimens from

Lovelock Cave, the existence of a long standing lacustrine subsistence/settlement pattern in the Humboldt Sink area. Napton (1971a:6) observed that:

".. these caves were not much used during the prehistoric period.. Perhaps the Carson Sink area actually provided a much less suitable habitat for man than might be indicated by the protohistoric and historic occupation of the area."

Napton's findings or lack of them is significant and has drawn comment from Hester (1973:93) who points out that the bulk of occupation was probably at open lakeshore sites and that the caves were probably used for caches, burials, and "occasional temporary occupancy." Morrison's (1964) lake-level settlement model offers one possible explanation for the apparent paucity of cultural remains as would the intensive relic-collecting in the area.

Busby, Kobori and Nissen (1975) conducted a test excavation of Eetza Cave (NV-Ch-54a), a small cave at the northern edge of White Throne Mountains overlooking the old Carson Lake and near the Wild Cat Freight ruins. This team was searching for evidence for a lacustrine adaptation and to more fully explore the nature of man-land relationships in the area. A (Lovelock Culture) firehearth was recovered as well as fragments of digging sticks and cordage, thought to be part of a fish net. Faunal remains included fish bones (Lahontan Cutthroat Trout, Tui Chub, and Tahoe Sucker). The following year, Busby (1976) and a team from the University of California, Berkeley, test-excavated Burnt Cave (NV-Ch-54) in the same area as Eetza Cave. Busby (1976:4) suggested the site was occupied by peoples of the Transitional and Late Lovelock Culture (1000 B.C. - A.D. 1800). Shell beads, basketry and netting fragments, firehearths, sandal fragments, projectile points and feather bundles were recovered. Kobori (1976) reported on the presence of Ovis canadensis remains from the site.

Archaeologists in this decade are still very much interested in problems of Holocene environmental change and its effect on prehistoric human populations (cf. discussion by Mehringer 1977). Recognizing the significance of a clear record of human occupancy that dates back to the early Holocene, Byrne, Busby and Heizer (in press) embarked on a palynological analysis project with sediments obtained from Leonard Rockshelter (NV-Pe-14) (cf. Heizer 1951a). The Leonard Rockshelter stratigraphy was investigated in 1950 by Antevs who interpreted the stratigraphy of the site as supporting evidence for his reconstruction of post-glacial climatic change in the Great Basin (Antevs 1955). Byrne, Busby and Heizer (in press) report that the Leonard Rockshelter pollen record generally confirms Antevs' interpretation of the site's stratigraphy and, in the broader sense, Antevs' three division reconstruction of Holocene climate (Antevs 1948, 1955). J.O. Davis (1978) of the Nevada Archaeological Survey (University of Nevada, Reno) published the results of his dissertation research on Lake Lahontan area tephrochronology. His study has added significant new information on Lahontan chronology that maybe applicable to archaeological investigations. Benson (1978) also studied Lahontan chronology and based on his research at

Walker and Pyramid Lakes, suggested revised dates for the known post-glacial dessication of Lahontan basin lakes.

The study of aboriginal rock art continued with increased emphasis on chronology, in-depth recordation and style analysis and experimental replication. Although Heizer and Baumhoff (1959, 1962) interpreted Great Basin petroglyphs as connected with hunting magic ritual, the relative dating of rock art was left to future researchers as was the problem of finding significant correlations of rock art style elements and a suitable approach to their analysis. Nissen (1971, 1975a,b, 1977, 1979) has been engaged in a doctoral research project aimed at the determination of significant correlations among western Great Basin petroglyph styles. Her work at the Grimes petroglyph site (NV-Ch-3) was the first application of a 'saturation' survey (cf. Nissen 1971, 1975a, 1979). Nissen (1975b) has also reported on the discovery of the Stillwater Facetted Style of petroglyphs, near Fish Cave. This style is thought to be the earliest rock art style in the Great Basin and pre-dates the ancient Pit-and-Groove style. Nissen (1977) suggested some management options for the important Grimes petroglyph locality. Recently, Bard, Asaro and Heizer (1976, 1978) and Bard (1979) explored and developed a relative dating technique for western Great Basin petroglyphs based on neutron activation analysis of desert varnish patination. The petroglyph style chronology originally advanced by Heizer and Baumhoff (1962) was found to be essentially correct. Replicate experiments designed to determine the time and effort required by Native Americans to manufacture petroglyphs at the Grimes Point site are reported by Bard and Busby (1974) and by Busby, Fleming, Hayes and Nissen (1978).

Following the suggestion by Napton (1971b) that a well equipped expedition should re-excavate Hidden Cave (cf. Grosscup 1956, Roust and Grosscup 1957) due to its importance in the understanding of regional culture chronology, Dr. D.H. Thomas of the American Museum of Natural History and a party of students from the University of Nevada, Reno began a two year program of excavations in 1979. It is significant that the Hidden Cave project is a cooperative venture, partially funded by the Bureau of Land Management and the American Museum of Natural History (BLM, press release, 1979). Perhaps in the 1980s a balance will be restored between non-directed and other-directed research as both kinds of research can be complimentary to each other in terms of academic and agency management interests.

In addition to the academic research conducted during the 1970s, a number of 'other-directed' research reports are available for the Carson and Humboldt Sinks. These studies are of varying quality and have been conducted by educational institutions, private contractors and by the 'in-house' cultural resources personnel of several government land-managing agencies. Many of these surveys indicate no cultural resources present in a project area but they are of some value for their notation of where sites are not present. Some of the major 'positive' survey reports will be discussed below.

These directed research projects are oriented toward management strategy, significance evaluation and cultural resource site distribution. For the most part, these studies are quite task specific, and in whole contribute little to the advancement of archaeological method and theory or to the solution of substantive research problems. These reports do, however, provide a great deal of information on the number, kinds, distributions, environmental settings and overall condition of the cultural resource site data base, which for the Great Basin has never been systematically inventoried.

The Salt Wells Basin has received a considerable amount of attention. York (1976) prepared an evaluation for a proposed motorcycle club race for the Bureau of Land Management. The potential adverse impacts of the race upon such historic sites as the Pony Express - Overland Mail and Telegraph route, the Fort Churchill - Sand Springs Toll Road, the Fallon to Rawhide Freight Road and what seems to be the grade for the never-completed Fallon-Sand Springs Electric Railway were assessed. York (1976:8-11) identified a number of significant prehistoric sites including 26Ch479 - a wetlands hunting/gathering camp (ca. 3000 B.C. - A.D. 500) from which a cache of Pinto and Elko points were recovered; 26Ch18 and 89 or the Salt Wells Site - reported by the Wheelers and Roust and Grosscup as being a protohistoric/historic Northern Paiute camp (cf. Grosscup 1974), among other sites. Botti (1977) conducted an extensive survey of parts of the Salt Wells Basin for the Bureau of Land Management prior to geothermal leasing. Her main contribution was the organization of the survey into ecologic-geomorphologic strata which could serve as a model for future studies focusing on settlement patterns. Botti (1977:21) reports that the Salt Wells Basin was extensively utilized from 5000 B.C. to the historic era. Large campsites and/or hunting and gathering areas cluster along basin margins or are found scattered in dunes on former shorelines. Heavy use of actual lake margins is suggested. Old shorelines surrounding Turupah Flat and the gravel bar which separates Turupah Flat from Eightmile Flat were aboriginally occupied. Hatoff and Botti (1977) conducted a follow-up inventory of selected geothermal drill sites in the area but no new sites were found. Hatoff and Ruhstaller (1977) report on their Bureau of Land Management directed inventory of a powerline through Allen Springs, Russell Pass, Eightmile Flat and Salt Wells area. Hattori (1979) has conducted an existing data inventory and archaeological survey of the nearby Simpson Pass area in an effort to determine the archaeological potential of the region prior to geothermal leasing. He located part of the Pony Express trail (26Ch595) and 14 other sites of lesser significance.

Geothermal development activities have resulted in a number of surveys in both the Humboldt and Carson basins. Botti (1976a) located some small lithic scatters near Lovelock. On a similar project Botti (1976b) recorded the Desert Queen Mine (26Ch337) near Cinnebar Hill south of Lovelock. Botti (1976c) re-located the Harvey Site (26Ch317) and the Dansie Site (26Ch 202), both thought to be Early Man sites (cf. Tuohy 1968a); recorded the Eagle Salt Works (26Ch330) and a number of small lithic scatters near Brady Hot Springs. Bard, Findlay and Busby (1979) recently inventoried areas near

Cinnebar Hill and the Mopung Hills. Bard et al. (1979) re-located one of the Cocanour localities (Western Pluvial Lakes Tradition) and recorded the Desert Crystal Salt Works and some 67 other sites. To the east, Jerrums and Rusco (1976) conducted an inventory and evaluation of cultural resources for a private salt company in areas near the Naval Air Station - Fallon B-20 bombing range. Two National Register eligible sites, 26Ch473, 474 were located along sand dunes at the south-east margin of the Carson Sink proper. Site 26Ch473, is a very large site, densely covered with cultural debris including faunal remains such as mussel shells. An Eastgate Series point was found indicating a chronological setting between A.D. 500 and A.D. 1300. This report is significant in that the edges of the Carson Sink are known to contain a wealth of archaeological materials, but have never been systematically examined by professional archaeologists. This site would seem to indicate exploitation of shoreline resources as indicated by the abundance of mollusc shells and possible water fowl bone remains (Jerrems and Rusco 1976:4; cf. Morrison 1964).

Historic sites archaeology, long neglected in the study area, has received greater attention from federal and state land managing agencies. In 1975, the Bureau of Land Management personnel located a rectangular basalt block building just southwest of Sand Mountain, Churchill County (cf. York and Pinzl 1975). The building, almost totally covered by drift sand, was thought to be the original Sand Springs Pony Express Station, rather than a similar structure lying one mile southeast which is presently marked and known as the Sand Springs Pony Express Station. The University of Nevada, Reno excavated the structure and Hardesty (1977) reported the building was in fact the original Sand Springs Pony Express Station. Hardesty (1977) presents a documentary history of the station followed by an architectural history and discussions of the human activities that occurred in and about the station. Of significance is Hardesty's (1977:97-100) social relationships which contains valuable ethnohistoric observations. Other studies related to the Sand Springs Station have been prepared by Dunbar (1975, 1976), Fowler (1975), York (1976) and York and Pinzl (1975).

A number of transmission line surveys have also been conducted in parts of the study area. Tuohy (1974a) discussed some of the sampling opportunities offered by such long transects which traverse widely diverse environmental, geographic, and cultural zones. Sierra Pacific Power Company, in particular, has contracted for a number of intensive corridor transect surveys throughout western Nevada (cf. Rusco and Seelinger 1974, Napton 1978, and Busby and Bard 1979).

Rusco and Tuohy (n.d.) and a team from the Nevada State Museum evaluated five locations in northwest Nevada for a proposed Sierra Pacific Power plant, one of which was in the Carson Desert area near Upsal (railroad) Siding. Tuohy, long interested in Early Man (cf. Tuohy 1968a,b, 1969b, 1970b) had recently evaluated the nearby Sadmat Site as being utilized between 9000 B.C. and 6500 B.C. (Tuohy 1968a:27-38, also Warren and Ranere 1968:6-18). Rusco and Tuohy (n.d.) located two possible Early Man sites during this project (26Ch189, 190) which consisted of alignments of low mounds of pebbles

gathered from surrounding desert pavement and lithic debitage of similar technology to the Sadmat Site. In a nearby area, Roney, et al. (1977) reported 40 pebble mounds at 26Ch510 and found evidence for Anathermal occupation in the area. A relatively intact portion of the Carson River Route of the Old California Trail (26Ch513) was also identified by Roney, et al. (1977).

Rusco (1975) of the Nevada State Museum, has reported briefly on the discovery and salvage of part of the original Lovelock 'Chinatown' on a recent Interstate Highway (80) improvement project. A more detailed report is in preparation (Rusco, personal communication, 1979).

A Cultural Sequence for the Carson/Humboldt Sink Area

Introduction

The past 20 years or so have seen a re-examination and reorientation of the goals and aims of North American archaeology. These changes in direction or more correctly emphasis, have been viewed by some practitioners in the field as "New Archaeology" (cf. Leone 1972) which is concerned mainly with a change from the more traditional or normative view of culture historical reconstruction to a concentration on questions of a more processual nature. Anthropological archaeology is concerned with past cultures. Most, if not all archaeologists are striving to achieve three related ends:

- (1) the reconstruction of culture history;
- (2) the detailing of the daily lifeways of earlier cultures, and;
- (3) the elucidation of cultural process in a broader sense with emphasis on the dynamic aspects of culture (Deetz 1970:115).

These three goals are in no sense mutually independent and all are in some way interrelated to a degree. That is to say, ". . . it would seem that the essential first step in achieving such an end (i.e., the precise and reliable description of the outlines of prehistoric societies) would be the development of techniques for generating reliable, synchronic cultural descriptions from the past. These in turn permit insights concerning process. . .and the understanding of process leads to sound and detailed cultural history (Deetz 1970:116)."

As Deetz (1970) and others have pointed out (cf. Binford 1962, 1968; Longacre 1970; Redman 1973; Watson et al. 1971; among many others), these three aims of archaeology are but steps in a mutually dependent process which must have accurate historical reconstructions (cf. Sabloff and Willey 1967; Flannery 1967; Thompson 1972) upon which to base any subsequent questions of a processual nature. If archaeologists are to accomplish their goal of presenting data on past societies or cultures as well as explaining prehistorical human behavior, an integrative combination of past techniques melded with recent innovation in method and theory must be brought into play for the most fruitful results.

The information presented below falls into the 'elementary data' category (cf. Thomas 1970:54) of culture history. This data is provided in order that further and future research questions can be formulated in the context of "established" and "reliable" cultural sequences for the area. The chronological context presented here can serve as a baseline for future work as well as offer further research possibilities and opportunities for archaeologists.

A number of archaeological and cultural sequences for the study area have been proposed by various researchers (cf. Loud and Harrington 1929; Heizer and Krieger 1956; Grosscup 1956, 1960; Roust and Grosscup 1957; Morrison 1964; Hester 1973; Bennyhoff 1958; Heizer 1951a, 1956; Napton 1970;

Lanning 1963) with the majority offering some correspondence in temporal overlap although often not in name. The sequences present a number of chronological periods with discrete attributes assigned to the cultures present. Some authors have refined the temporal scale by dividing various periods into phases. Projectile points, occasionally supported by other temporally relevant evidence and a series of radiocarbon dates serve as the main basis for the various researchers' postulated chronological periods since they have been shown by a number of investigators (cf. Heizer and Hester 1978) to have significant value as temporal indicators or 'fossil directors.'

Our cultural sequence will essentially follow Hester (1973) in his overview of Great Basin chronology for the western subarea (Figs. 19-20).

Pre-Projectile Point Culture(s)

The possibility exists, however remote, that archaeological materials predating the tenuous fluted point tradition (see below) have been or are being recovered from within the study area and surrounding region (cf. McGee 1889; Carter 1958; Tuohy 1970b) although their definition and chronology have yet to be accepted without criticism by the professional archaeological community (cf. Meighan 1978; Hester 1973:58-61). These materials, believed to occur before the established period of man's occupation of western North America (cf. Meighan 1978), have been assigned to the Pre-Projectile Point Stage, a hypothesis of some considerable controversy in New World prehistory (cf. Willey and Sabloff 1974 for an overview). It has been proposed by a number of researchers (Krieger 1962, 1964; Willey and Phillips 1955, 1958; MacNeish 1958, 1961, 1962, 1976; Jennings 1964; Irwin-Williams 1967, 1968; Cressman 1968, 1977; Rouse 1976; Bryan 1965, 1969, 1978 (ed.)) that there is a stage in New World prehistory which predates the production of projectile points or 'well-flaked' bifaces. This period is felt to have Old World late Paleolithic origins and to date sometime prior to 20,000 years B.P. Pre-projectile point proponents assume that points were not included in the tool kits of the people utilizing the Bering Land Bridge for movement to North America. At present, evidence of early cultures in the New World is questionable and undatable (cf. Haynes 1969a,b; Hester 1973; Wendorf 1966), although it remains a possibility that one of the claimed pre-projectile point sites may yet prove to be ancient. No data are available in the study area to currently support the presence of a pre-projectile point stage in the cultural sequence.

The subsistence adaptation of any groups present in the area during this period would have emphasized frequent movements by independent family groups oriented to an unspecialized hunting/gathering lifeway - an economy and social structure probably not dissimilar to that known for the ethnographic Northern Paiute.

In summary, there are no real data on possible pre-projectile point materials in the defined study area or surrounding region. It is doubtful, based on the present archaeological knowledge of the western Great Basin

AD/BC	East-Central Sierra Nevada	Mono Lake	Tonopah	Humboldt Sink	Carson Sink	Grass Valley
1950						
1000	King's Beach Complex	DSN, CT, OVBW Rose Spring/ Eastgate	"Shoshonean"	DSN, CT Rose Spring/ Eastgate	Dune Springs Rose Spring/ Eastgate	Historic Late Prehistoric
0	Martis I			Late		
1000	Martis II			Lovelock Trans. Culture	Lovelock Culture	
2000		Elko, Pinto, Humboldt	"Late Desert Archaic"	Early		Middle Prehistoric
3000	Spooner Complex			Leonard Culture	Carson Phase?	
4000						
5000					Hidden Phase?	Early Prehistoric
6000				Humboldt Culture		
7000	Western Pluvial Lakes Tradition?	Western Pluvial Lakes Tradition	Western Pluvial Lakes Tradition		Western Pluvial Lakes Tradition	?
8000				?	Fallon Phase?	
9000		Fluted? Sandia?	Fluted?			
10,000		Hypothetical Pre-Projectile Point Stage ?				

Figure 19: Prehistoric Chronological Sequence in the Western Great Basin (From Hester 1973).



AD/BC	Southwestern	Northern	Western	Eastern
1000	LATE PREHISTORIC ROSE SPRING/ EASTGATE	LATE PREHISTORIC ROSE SPRING/ EASTGATE?	LATE PREHISTORIC ROSE SPRING/ EASTGATE	LATE PREHISTORIC FREMONT/ VIRGIN BRANCH
0			GREAT BASIN ARCHAIC	GREAT BASIN ARCHAIC
1000	GREAT BASIN ARCHAIC	GREAT BASIN ARCHAIC	Martis Complex	Hogup II
2000				Danger V
3000	(Pinto Basin, Death Valley II, Pre-Yuman)		Lovelock Culture	Danger IV
4000			Leonard Culture	Hogup I
5000	Occupational hiatus?	Altithermal?	Altithermal?	Danger III
6000		Mazama		
7000	WESTERN PLUVIAL LAKES TRADITION	WESTERN PLUVIAL LAKES TRADITION	WESTERN PLUVIAL LAKES TRADITION	
8000	(San Dieguito; Death Valley I; Lake Mohave)	(Connley Caves, Cougar Mtn. Caves, Coyote Flat, Guano Valley)	(Sadmat; Tonopah; Black Rock, Coleman)	Danger II; Escalante Valley
9000				Deer Creek Cave Danger I
10,000	FLUTED POINT TRADITION?	FLUTED POINT TRADITION?	FLUTED POINT TRADITION?	
11,000		Fort Rock Cave	Fishbone Cave?	
12,000		Paisley and Catlow Caves?		Tule Springs
13,000		Wilson Butte Cave		

Figure 20: Chronological Ordering of the Prehistoric Great Basin Cultural Sequence (From Hester 1973).

that remains of this postulated stage will be recovered during any future research.

Fluted Point Tradition

Surface provenience finds of fluted projectile points, typologically similar to the Clovis and Folsom points of the Great Plains and Southwest, have been reported throughout the Great Basin with frequent finds occurring in western and southern Nevada and in southeastern California (Hester 1973: 123; Warren and Ranere 1968:9; Tuohy 1965, 1968a,b, 1969b; Davis and Shutler 1969; among others). Fluted points have usually been found along post-Pleistocene lake shores and in the near vicinity often in association with crescents (Great Basin Transverse Points, cf. Heizer and Hester 1978), graters, borers, and lanceolate stemmed projectile points (Tadlock 1966: 664-665; Davis and Shutler 1969:156; Hester 1973).

Fluted points in the study area are only known from the Harvey Site in the Carson Sink (Tuohy 1968a). The site is a sand spit at an elevation of 4100 feet with a mixed lithic assemblage present. Among the 30 artifacts recovered to date are one Clovis fluted point, one laurel leaf shaped point, Lake Mohave, Hell Gap, Pinto and Elko Eared projectile points. Tuohy (1968a: 33) states that the location of the Clovis point was about 300 feet below the maximum level attained by Pleistocene Lake Lahontan. No fluted points are known from the Humboldt Sink although there are several instances of their occurrence in the region(s) bordering on the study area (Tuohy 1967, 1968a,b; 1969b; Clewlow 1968a; Richards 1968; Campbell and Campbell 1940; Campbell 1949; cf. Davis 1969:Fig. 1).

Temporal placement of these surface provenience projectile points has not been well documented. Their association with later materials is a definite possibility. The fluted points in the Great Basin are generally thought to be coeval with the Great Plains or Southwestern points dating to ca. 8000-10,000 B.C. (Meighan 1963; Haynes 1964, 1969a; Bryan 1965; Tuohy 1968; Meighan and Haynes 1968, 1970a,b; Davis and Shutler 1969; Davis 1970; cf. Rohn 1978 and Caldwell and Henning 1978). As noted previously, a number of the fluted points have been found in apparent association with assemblages attributed to the 'later' Western Pluvial Lakes Tradition dated at 9000-6000 B.C. by Hester (1973:62-65). In view of the chronological problems with the fluted points, future research must "firmly establish both their temporal span and cultural association in the Great Basin (Hester 1973:62)."

A problem with the interpretation of the various fluted point finds is the ongoing controversy over whether or not these artifacts represent an early "big-game hunting complex" analogous to the big-game hunting tradition known for the Great Plains and Southwest. The argument of the various interpretations is centered around the degree of inferable associations of fluted points with the procurement of extinct megafauna, an association which has yet to be adequately demonstrated in the stratigraphic context, or for that matter, any context for the Great Basin (Wallace 1962; Baumhoff

and Heizer 1965; Heizer and Baumhoff 1970; Hester 1973:62; cf. Tuohy 1974b; Wilke et al. 1974).

Heizer and Baumhoff (1970) see belief in a ". . . free-roaming, big-game hunting pattern" (Tuohy 1968b:31) as a "statement of faith and not of fact (1970:1)" in contrast to Tuohy's view (1968b) on the subject, who has proposed the appellation of Western Clovis Tradition (Tuohy 1974b) in opposition to the Fluted Point Tradition of Hester (1973). While not dismissing the possibility of a big-game hunting pattern in the Great Basin, Heizer and Baumhoff (1970:7) note that, ". . . the close association of transverse points and early projectile point forms such as noted by Clewlow (1968a), Tuohy (1968a,b) and Shutler and Shutler (1959) with lake basins seems to hint at a lacustrine rather than a big-game hunting economy in the western Great Basin about ten millennia ago." At present, no strong case can be made for big-game hunting having occurred in the study region although future archaeological or paleontological research may reveal a firm association of fluted points and extinct megafauna.

Further controlled archaeological investigations, centered on the identification, distribution and assemblage analysis, both within the study area and surrounding region, may provide analytical data that would aid in the interpretation and clarification of fluted point occurrences in the Great Basin.

Western Pluvial Lakes Tradition (9000 B.C. - 6000 B.C.)

The Western Pluvial Lakes Tradition was defined by Bedwell (1970:23) as ". . . a general way of life directed toward the . . . exploitation of a lake environment." Using data from his research in the Fort Rock Valley, Oregon a temporal range of 9000 - 6000 B.C. was proposed for this lacustrine adapted tradition. A number of early assemblages in the Great Basin associated with pluvial lake shores have been included within this tradition including "Lake Mohave," "San Dieguito," "Western Lithic Co-Tradition," "Hascomat," and "Fallon Phase" (cf. Hester 1973:62). In the western Great Basin the Western Pluvial Lakes Tradition is represented by the Lake Mohave/San Dieguito Complex, the Hascomat Complex and the Fallon Phase.

The Lake Mohave Complex was initially defined by the Campbells (1937) for an assemblage characterized by sand blasted projectile points and artifacts in the vicinity of Lake Mohave in the eastern Mohave Desert. Occurring on the shore lines of fossil Lake Mohave and in an area essentially equivalent with the outlet channel of Silver Lake at its northern end, this complex is characterized by the absence of milling equipment and the presence/dominance of percussion flaked tools. Known best for its diagnostic Lake Mohave and Silver Lake projectile points (cf. Amsden 1937; Heizer and Hester 1978) the complex also contains hammerstones, unifacial and bifacial tools, choppers, scrapers, knives, crescentric stones, drills and leaf-like blades. The Lake Mohave complex has been interpreted as representing a subsistence pattern focused on hunting with little emphasis on seed gathering or fishing although this has yet to be demonstrated in a stratigraphic context (cf.

Amsden 1937;90-92). While chronological interpretations of this complex have been seriously debated by a number of researchers (cf. Warren and DeCosta 1974; Warren and True 1961; Heizer 1965, 1970c; Warren 1967; Warren and Ore 1978 among many others) the currently accepted time span is 8000 - 6000 B.C. (Warren and True 1961; Warren 1967; Wallace 1962; cf. Hester 1973) which corresponds with Bedwell's (1970) range of 9000 - 6000 B.C. for the Western Pluvial Lakes Tradition thus indicating a probable occupation of the study area during this period (see below).

The "San Dieguito Complex" has been defined by Warren (1967). Warren has grouped a variety of sites, localities and complexes associated with pluvial lakes into this complex; among them, materials from the Carson Sink (Warren and Ranere 1968; Tuohy 1968a; Grosscup 1956; Roust and Grosscup 1957). San Dieguito type materials include "leaf-shaped knives of several varieties, small leaf-shaped points, stemmed and shouldered points generally termed "Lake Mohave and Silver Lake," ovoid, large domed and rectangular end and side scrapers, engraving tools, and crescents" (Warren 1967:177). A generalized hunting tradition has been postulated as the economic pattern. Chronologically the San Dieguito complex ranges from between ca. 2000 B.C. for coastal sites to over 7000 B.C. for the Lake Mohave artifacts at Owens Lake in eastern California (Warren 1967; cf. Irwin-Williams 1968:50).

Within the boundaries of the study area are a number of sites which have been linked to the Western Pluvial Lakes Tradition. A localized manifestation of the Western Pluvial Lakes Tradition/San Dieguito/Lake Mohave complexes is seen in several sites that have been linked to the "Hascomat Complex" in the Carson Sink (cf. Warren and Ranere 1968). The Sadmat Site, located just above the 3990 foot beach line of Pleistocene Lake Lahontan near Hazen, Nevada yielded a large collection of artifacts. Surface collections include Haskett and Lake Mohave projectile points, crescents, various bifaces and scrapers with various additional artifacts. The Sadmat locality is of some interest due to the presence of San Dieguito-like rock cairns and rock alignments (Tuohy 1968a; Warren and Ranere 1968). The Dansie Site, salvaged after depredations by relic collectors, yielded a collection of 300 artifacts that fit in well with the Lake Mohave and San Dieguito materials recovered from the Sadmat Site (Tuohy 1968a). The Harvey Site, mentioned previously, also yielded several Lake Mohave points (Tuohy 1968a). The "Fallon Phase" was defined by Grosscup (1956; cf. also Roust and Grosscup 1957) based on materials recovered from high beach lines on the edge of the Carson Sink. Some of the lithic materials from the sites (e.g., Hathaway Beach) are large basalt flakes and crude bifaces which some researchers believe to be of some great age (cf. Hester 1973: 65; also Tuohy 1968a). Much of the material, however, is recognizable and includes Haskett, Lake Mohave, Silver Lake and possibly Black Rock Concave Base projectile points (sites NV-Ch-77, NV-Ch-61; cf. Tuohy 1970b). These sites have been grouped by Warren and Ranere (1968) into their Hascomat Complex.

The Western Pluvial Lakes Tradition has not yet been documented in the Humboldt Sink area although the Cocanour Site (Stanley, Page, and Shutler 1970) has been suggested as a possible candidate (cf. Bard et al. 1979).

R.F. Heizer has suggested that components of the Western Pluvial Lakes Tradition may eventually be found in the Humboldt Valley under the present thick mantle of Medithermal alluvium along the shore of Humboldt Lake (cf. Hester 1973:125; R.F. Heizer, personal communications, 1976-78).

The Western Pluvial Lakes Tradition has been offered as an "umbrella" period for a number of regional cultural expressions localized along pluvial lakeshores in the Great Basin and California. Among these local expressions are the Lake Mohave and San Dieguito complexes, the Hascomat Complex and the Fallon Phase. There is some debate on the degree of economic orientation of the Western Pluvial Lakes Tradition with some researchers advocating a lacustrine adaptation of seed gathering, hunting or a combination of these (cf. Jennings and Norbeck 1955; Jennings et al. 1956; Jennings 1957, 1964; Rozaire 1963; Heizer 1964, 1966; W. Davis 1966; Clewlow 1968a; Heizer and Baumhoff 1970; Hester 1973) while other scholars suggest a hunting tradition basing their argument in part on the absence of artifacts attributable to lacustrine and/or seed gathering activities (cf. Amsden 1937; Rogers 1939; Wallace 1958; Hunt 1960; Warren and True 1961; Warren 1967; Warren and Ranere 1968; Tuohy 1968a, 1970a). Further archaeological research in the study area, especially the Humboldt Sink region, can be oriented towards clarifying some of these problems associated with the Western Pluvial Lakes Tradition. Artifact distributions, geological (esp. stratigraphic) and archaeological associations and culture significance could be emphasized in any future problem oriented research in the region.

Great Basin Archaic (5000/6000 B.C. - A.D. 500/600)

The term "Great Basin Archaic" as proposed by Shutler (1961:69, 1968: 24) and modified by Hester (1973:125-126) represents the varied archaeological remains present in the Great Basin between ca. 5000/6000 B.C. and ca. A.D. 500/600. The Great Basin Archaic combines and emphasizes the contemporaneity of the "Desert Culture" (Jennings 1957, 1973; Jennings and Norbeck 1955) and "Lacustrine" (Heizer and Krieger 1956; Rozaire 1963; Cowan 1967; Napton 1969; Heizer and Napton 1970a) subsistence patterns. A number of local designations are known for the archaeological manifestations occurring in, or in the near vicinity of the study area during this period. For the Humboldt Sink, the Humboldt, Leonard and Lovelock Cultures (Heizer 1951a, 1956; Loud and Harrington 1929; Grosscup 1960) have been described. For the Carson Sink the Hidden and Carson Phases and the Lovelock Culture have been described by Grosscup (1956), Roust and Grosscup (1957) with additional material provided in Morrison (1964) (Fig. 16).

Humboldt Sink

The Leonard Rockshelter site, excavated by R.F. Heizer in 1950 (Heizer 1951a), yielded a long cultural sequence upon which most chronological correlations in the Humboldt Sink have since been made (Hester 1973:91). A number of these 'phases' can be included within the Great Basin Archaic. The Humboldt Culture of ca. 5000/6000 B.C. to 4500 B.C., found at the base of the shelter's deposit in a deep guano layer, was defined from a number of recovered atlatl parts, a lanceolate biface (somewhat reminiscent of

the so-called Cougar Mountain type (Hester 1973:91)), Olivella beads and obsidian flakes. The culture dates from the Anathermal period (cf. Antevs 1948, 1953, 1955) supposedly at a time when the region's post-Pleistocene lake levels were higher than at present (cf. Benson 1978). The Leonard Culture, apparently representing occupation of the Humboldt Sink during the Altithermal, is known only from carbonized basketry and an associated infant burial. The basketry has been radiocarbon dated to 3786 B.C. (Heizer 1951a:92). The Leonard Culture has tentative dates of ca. 4200 B.C. to ca. 2500 B.C. (?) Transitional and Late Lovelock (?) Culture remains complete the sequence from 500 B.C. to contact times (cf. Heizer 1951a:Fig. 43; Figure 15, this report).

The excavation of Lovelock Cave and a number of evaluations of its chronological sequence by several researchers have provided the main data for prehistoric chronological ordering in both the Humboldt and Carson Sinks for the Great Basin Archaic period. The partial stratigraphic excavation by Loud and Harrington (1929) provided for the initial ordering of the recovered materials - Early Lovelock, Transitional Lovelock and Late Lovelock. A series of radiocarbon dates (Heizer 1956; cf. Cressman 1956) led to Grosscup's (1960) re-evaluation of the Lovelock Cave chronological sequence and the assigning of chronological boundaries to the phases proposed initially by Loud and Harrington (1929). Based on his analysis of the materials and the radiocarbon dates available for the site, Grosscup assigned the Early Lovelock to a period between 2000-1000 B.C., Transitional Lovelock 1000 B.C. to 1 B.C. and Late Lovelock from 1 B.C. to A.D. 1000.

A number of sites with Great Basin Archaic assemblages are also known from the Humboldt Sink although they have not provided cultural sequences as lengthy and as detailed as Leonard Rockshelter and Lovelock Cave. Among these are Humboldt Cave with an occupation beginning ca. 3 B.C. and lasting throughout Transitional and Late Lovelock times with use continuing up until contact times (Heizer and Krieger 1956); Ocala Cave (Loud and Harrington 1929); NV-Pe-5, an open occupation and workshop site with primarily Elko series points, although Humboldt Concave Base A and Rose Spring Corner Notched are also represented (Elsasser 1958; Cowan and Clewlow 1968); NV-Pe-8, a cache cave of the "Middle Lovelock" (Baumhoff 1958a); the Cocanour Site, an open occupation site with two house rings and a projectile point assemblage mostly of Pinto series material with a suggested minimum date of 2000 B.C. (Stanley, Page and Shutler 1970); and the Humboldt Lakebed Site, NV-Ch-15, with a Great Basin Archaic projectile point assemblage and later materials both present. A date for the initial occupation of NV-Ch-15 around 2000 B.C. has been suggested (Cowan and Clewlow 1968).

Carson Sink

A number of sites in the Carson Sink show manifestations of the Great Basin Archaic. Aside from Hidden Cave (Grosscup 1956; Roust and Grosscup 1957; Morrison 1964; Ambro 1966; Roust and Clewlow 1968b, among others) they have been poorly reported in the literature and are known only from archival site record data (cf. History of Research, this report). Hidden

Cave in the Grimes Point area was excavated by G. Grosscup and N. Roust in the early 1950s and allowed for the development of a culture sequence for the Carson Sink region (Fig.). Units or phases belonging to the Great Basin Archaic from this site include the poorly defined Hidden and Carson Phases and the Lovelock Culture (or phase). The Hidden Phase, believed to represent the Anathermal occupation of the area, is poorly known and was defined on the basis of scant cultural remains (primarily Humboldt Concave Base A projectile points) from the Mud Flow gravels at the base of the site. The following phase in the sequence, the Carson Phase, is linked to Altithermal occupation of the sink and is based on two projectile points (probably Pinto series (cf. Hester 1973:92)) recovered from the Aeolian Silts. Two phases of the Lovelock Culture have been noted from Hidden Cave. The 32 Inch Midden has been assigned to the "early Phase" and includes Pinto, Elko and Gypsum projectile point types (Roust and Clewlow 1968). The "Later Phase", contained in the Surface or Top Midden, includes Humboldt Basal Notched, Gypsum, Elko and Pinto projectile points.

Test excavations at Hanging Rock Cave, also in the Grimes Point area, have indicated a Late Lovelock occupation (cf. Tuohy 1969a) although Hester (1973:93) believes that the projectile points from the site are indicative of possible Early and Transitional Lovelock Components.

There is some debate over settlement patterns in the Carson Sink region during Archaic times. Napton (1971a), on the basis of his surveys and excavations in the Grimes Point area has observed:

"...these caves were not much used during the prehistoric period . . . Perhaps the Carson Sink area actually provided a much less suitable habitat for man than might be indicated by the proto-historic occupation of the area" (Napton 1971a:6).

Hester, on the other hand, is of the opinion that there was indeed a substantial occupation of the area in prehistoric times with the majority of occupation centered around open lakeshore sites with the caves utilized for caches, burials and occasional temporary occupations (Hester 1973:93; cf. Morrison 1964). His observations on a number of private collections from the region indicate a wide range of projectile points including the Humboldt, Elko, Eastgate, Rose Spring, Pinto, Cottonwood and Desert Side-Notched types (Hester 1973:93). In support of the hypothesis of a primary lakeside settlement pattern occupation, R. Morrison (1964:105-106) notes:

"The density of occupation seems to have fluctuated with lake levels, being greatest when the lakes were highest and least when they were desiccated, although sparse temporary occupation may have persisted along the Carson River and perennial springs through some of the dry intervals."

Morrison (1964) also believes that occupation of the Carson Sink reached

its peak during the last 2000 years (during the second Fallon Lake). Unfortunately, as Hester has observed, due to the activities of the relic collectors we will probably never clearly define the chronological sequence in this region of the Great Basin with any degree of assurance (cf. Hester 1973:93).

In summary, the Great Basin Archaic has been characterized in general as an assortment of relatively similar material culture traits, especially in lithic artifacts, occurring between 5000/6000 B.C. and A.D. 500/600. Characteristic projectile points are Silver Lake, Humboldt, Pinto, Gypsum or Elko Series points (Hester 1973:126). Previous research has indicated the presence of several economic patterns with the aboriginal inhabitants utilizing both desert and lacustrine resources as well as mountain/upland environments. Future archaeological research in the study area may improve the local definition of Great Basin Archaic sites with respect to chronology and related assemblages especially in the Carson Sink region where the record is rather poorly known prior to the "Lovelock Culture." Detailed research may also indicate site elevational and ecological relationships during the early Great Basin Archaic as compared to its later stages especially in regards to post-glacial climatic change and its effect on man-land relationships.

Rose Spring-Eastgate Complex (A.D. 500/600 to A.D. 1000/1200)

The Rose Spring-Eastgate Complex is set apart from previous complexes on the premise that projectile points of the Rose Spring and Eastgate series (cf. Heizer and Hester 1978) represent the introduction of the bow and arrow into the Great Basin (cf. Lanning 1963:268). Hester (1973:126) notes, "With the appearance of these two points, the larger dart point forms previously in use appear to have subsided in popularity, and in some instances, disappeared altogether." With respect to subsistence patterns during this period, Hester (1973:126) states that there is no conclusive evidence that the introduction of the bow and arrow brought about any significant economic changes. This statement may be open to some question as Grant, et al. (1968:112-115) have hypothesized that the bow and arrow increased the efficiency of bighorn sheep hunters in the Coso Mountains of California and ultimately caused the decimation of the sheep in this area. The increased technological advantage offered by the bow and arrow in hunting the existing game may correlate with lexicostatistical data (cf. Lamb 1958) indicating a population shift from the northern Mohave desert, ca. A.D. 900/1000, to other regions.

No specific local phases for either the Carson or Humboldt Sinks have been designated although there is considerable overlap with the Late Lovelock Culture in both areas. Published sites with a definite or probable Rose Spring-Eastgate Complex component present are Lovelock Cave (Grosscup 1960; Heizer and Napton 1970a; Clewlow and Napton 1970; Clewlow 1968b); Humboldt Lakebed Site (Heizer and Clewlow 1968); Humboldt Cave (Heizer and Kreiger 1956); NV-Pe-5 (Elsasser 1958; Cowan and Clewlow 1968); NV-Pe-67 (Cowan and Clewlow 1968); and a number of open sites in the Carson Sink (cf. Hester 1973:93; Grosscup 1956). Hester (1973) dates this complex as

occurring between A.D. 500 to A.D. 1000/1200 (Fig.20). Further research in the study region could conceivably address the technological impact of the bow and arrow on both the human and animal populations and on subsistence strategies.

Late Prehistoric Complex (A.D. 1000/1200 - Contact Period)

The Late Prehistoric Complex has been defined by Hester (1973:127) as "the introduction of brownware ceramics and Desert Side-Notched and Cottonwood series projectile points ca. A.D. 1000 or somewhat later" with these materials marking the ". . .advent of the Paiute and Shoshonean peoples, ancestors of tribes found in the Great Basin at the time of historic contact." Linguistic data (cf. Lamb 1958) suggests that these Numic speaking groups migrated from southeastern California (in the Death Valley vicinity) into the Great Basin ca. A.D. 950. This theorized migration, based primarily on lexicostatistical and glottochronological analysis, is currently under review and revision (cf. Goss 1977 for an overview of the problem; also Linguistic section, this report).

Late Prehistoric Complex material is present in some quantity within the boundaries of the study area (cf. Loud and Harrington 1929; Napton and Heizer 1970; Grosscup 1960; Clewlow and Napton 1970; Heizer and Clewlow 1968; Heizer and Krieger 1956; Cowan and Clewlow 1968; Roust 1966; Grosscup 1956; Bard, Findlay and Busby 1979; Busby and Bard, in preparation; cf. Hester 1973:93, among others). Locally, Grosscup (1956) has described the Dune Springs Phase for the latest cultural remains in the Carson Sink. These materials have come from open occupation sites centered around surviving water sources. Desert Side Notched projectile points are characteristic of these occupations and Grosscup (1956:62) links this phase to historic Northern Paiute populations. According to Grosscup (1963) there is no major change or difference between the economic activities of the Lovelock culture and the Northern Paiute. Techniques and forms of manufacture change over time but the functions remain the same. Future research could be directed to recognizing material culture differences between the Northern Paiute and the prior inhabitants of this region (cf. Lamb 1958; Loud and Harrington 1929:Appendices; Stewart 1939; Linguistic section, this report; Mythology section, this report). No ceramics are known for the Carson and Humboldt Sinks during this period. Settlement-subsistence patterns probably followed a lacustrine/desert lifeway with similarity to the known ethnographic pattern recorded for the region (cf. Stewart 1938; Stewart 1941; Wheat 1967; Grosscup 1963; Napton 1969, among others).

Summary

From the various archaeological accounts available for the study area and from data in the surrounding regions, a tentative occupational history for man in the Carson and Humboldt Sinks has been developed. It is judged unlikely, after a review of the extant data base, that man inhabited the region prior to 10,000 B.C. (Pre-Projectile Point Horizon), although evidence from other surrounding areas may indicate the presence of "early man" in

western North America. Man probably initially occupied the Carson and Humboldt basins ca. 10,000 - 9000 B.C. although the archaeological evidence for this early occupation (Fluted Point Tradition) is scant and subject to some interpretation. From ca. 9000 - 6000 B.C. cultural activities were probably confined to lakeshore adaptations with a generalized subsistence pattern emphasizing either lacustrine or megafaunal food resources (Western Pluvial Lakes Tradition). It is probable that neither resource was emphasized and that both were opportunistically exploited.

Perhaps as early as 6500 B.C. a basic hunting and gathering subsistence pattern, the Great Basin Archaic, was established. This lifeway is initially represented by the Humboldt Culture in the study area. During the Great Basin Archaic (5000/6000 B.C. - A.D. 500/600) ground stone food processing implements (e.g., manos, metates) apparently became common inferring the increased use of plant resources and increasing reliance on lakeside resources. Humboldt, Pinto, Silver Lake, Lake Mohave, Elko and Gypsum projectile points are characteristic of this period although Silver Lake and Lake Mohave points are also known to represent the Western Pluvial Lakes Tradition as well. The Leonard Culture or Carson Phase are thought to coincide with the Alithermal period in which the Humboldt and Carson Lakes were desiccated. Human response to this period of climatic change is seen as either abandonment or sparse habitation until around 2500 B.C. Evidence for this "hiatus" in occupation comes from Leonard Rockshelter and Hidden Cave.

The Lovelock Culture, divided into Early, Transitional, and Late, begins around 2500 B.C. and is characterized by a successful lacustrine adaptation. Settlement was primarily in open, lakeside villages along with the occasional use of caves for specialized purposes or foul weather shelter. Components of this "culture" lasted until post-contact times.

The introduction of the bow and arrow is indicated by the transition from the larger, heavier projectile points of the preceeding periods with the appearance of the smaller and lighter Rose Spring and Eastgate points ca. A.D. 500 - A.D. 1000/1200 (Rose Spring-Eastgate Complex).

Cottonwood Triangular and Desert Side-Notched projectile points appear ca. A.D. 1000 to Historic times and mark the Late Prehistoric Complex or Dune Springs Phase. The appearance of these point types also marks the entry of the Numic speaking peoples into the Great Basin in general and the study area in particular.



SITE RECORDS ANALYSIS

As part of our research effort all of the available cultural resource site inventory records were compiled and subjected to an intuitive review. This brief 'site form analysis' is presented as a qualitative guide to future researchers working in the study area. Cultural resource site record forms were obtained for study through an archive search of Bureau of Land Management (Carson City and Winnemucca District Offices), Nevada State Museum and Archaeological Research Facility (University of California, Berkeley) site files. Allowing for missing site forms and very recent site records presently not available, there are some 420 cultural resource properties recorded in the study area as defined in Fig. . Many of these 'recorded' sites have since been looted by relic collectors and a handful of others have been collected or excavated by interested scholars and university/museum field parties. Many sites recently identified on Bureau of Land Management sponsored surveys were collected ('mitigated') in the field. Overall, the existing cultural resource inventory of the study area is inadequate. It is immediately apparent that the recent site inventory forms contain more detailed site information and map location details than the earlier site records. In fact, a great many of the archaeological sites located and recorded prior to the late 1960's were poorly recorded and it would be quite difficult to re-locate them in the field without the commitment of substantial research funds. To some extent, this situation has been alleviated through continued archaeological survey contracted for, or carried out by, the Bureau of Land Management.

Site survey in the study area has been haphazard at best, and a statistically reliable sample of sites does not exist at this time. Early survey teams recorded both locally known sites (e.g., large caves, rock-shelters, village/camps, or other favored 'collecting spots') and sites that could be found in easily accessible areas (near roads, towns, railroads) or where archaeologists thought sites should occur based on their own intuition and/or experience. Later survey teams examined areas arbitrarily chosen by sponsoring agencies. In any case, most of the study area, except for a few Bureau of Land Management sponsored surveys in the areas south of Lovelock and north of Fallon, has never been systematically sampled. Therefore, the site data base presently available is biased.

The majority (287) of the site records indicate aboriginal (and in some cases, historical) occupation sites in lacustrine settings; that is, sites located on lakeshore margins; on older Lake Lahontan terraces; dunes and blow-outs, alkali flats or playas; marshes; and small hummocks or rises above the old lake beds. Occupation in caves, rockshelters, crevices, or on open steep talus slopes is indicated by 50 site records. Occupation is indicated on areas of upland desert (desert pavement, pediment, bajada, alluvial or colluvial fans) by 32 site records. Utilization of outcrops, ridgetops, canyons, saddles and geomorphic anomalies is indicated on 11 site records. Occupation alongside river banks, washes or other riparian settings account for 11 site records. A number of lacustrine setting sites could also be classified as riparian sites, however. Finally, 7 sites are recorded

from springs or in the near vicinity of springs. Most of the inventoried sites are from 'low' elevational settings. The Carson and Humboldt Valleys are generally no lower than 3850 feet in elevation. Seventy-nine sites occur below 3900 feet; 148 sites occur between 3900 and 4000 feet; and 75 sites occur between 4000 and 4100 feet. At elevations above 4100 feet, the number of sites drops markedly. From 4100 to 4200 feet are located some 36 sites, and from 4200 to 4300 feet are 14 sites. Above 4300 feet are a handful of sites, some of which range in elevation up to 7300 feet.

A great many of the available site records do not specify the cultural or chronological affiliation of the identified sites. It can be stated that most of the lower elevation sites, with some exceptions, can be attributed to Medithermal Age occupation by peoples of the Lovelock Culture. Sites at higher elevations are generally older (Anathermal, Altithermal Age) and probably reflect the habitation/utilization by peoples of the Humboldt and Leonard Cultures or reflect specialized sites (quarries, cave/rockshelter caches) of the later Lovelock Culture. Historic site locations are related to other factors than those that pertain to aboriginal site location.

With respect to the U.S. Naval Air Station - Fallon B-20 bombing range in the Lone Rock vicinity of the Carson Sink, there exists at this time, no officially recorded or known archaeological sites within the present boundaries of the B-20 range. However, as discussed in Appendix B (Collector Interviews) there is evidence that significant archaeological resources are present in the southwestern corner and southern half of the western boundary of both the present and proposed range boundaries.

It is appropriate here to suggest some specific recommendations to land managing agencies with jurisdiction in the study area (Bureau of Land Management, Truckee-Carson Irrigation District, U.S. Naval Air Station - Fallon). It is clear that the existing site inventory for the general area is woefully inadequate for management purposes. Although agency planners can obtain some idea of where prehistoric cultural resource sites are likely to be located (e.g. lakeshore/low elevation settings), archaeological sites are present in all types of ecologic and physiographic locations (cf. Botti 1977) and the present corpus of site records offers no reliable data as to the probable distribution and density of cultural resource sites in the study region as a whole. Hence, it is strongly recommended that these land managing agencies initiate a long and short term program of cultural resource site inventory which will prove adequate for long term agency planning/development actions. A program of statistical sampling (e.g. a Bureau of Land Management Class II Inventory, or equivalent) of various portions of the study area would result in a number of planning/management benefits.

A sampling program would allow for reconnaissance of areas never surveyed due to lack of contemporary accessibility. As well, such a program would aid in the elimination of some of the current bias in our knowledge of site distribution, and provide reliable and reproducible information for both agency and professional interests. Typical 'Class II' inventories in the

study area (cf. Bard, Findlay and Busby 1979; Roney, et al. 1977; Botti 1976c) have demonstrated that a statistical sampling program of survey/inventory can predict, within definable limits of error, the total number of sites within a given project area on a sample as small as 10%. Within the study area, the Bureau of Land Management has already initiated a Class II sampling/inventory program, but only on a 'as needed' basis. As part of a long term program to obtain projections of site location and density within the Carson and Humboldt Valley region, the following seven step approach to initiation of a sampling survey/inventory program might be considered. This approach is adapted from a similar proposal of Jenson and Reed (1979: 156-159).

- 1). Definition of the sampling universe and its boundaries on maps and on the ground.
- 2). Division of the defined sampling universe into useful inventory areas based on ecological or cultural criteria, insuring good spatial distribution of sample units and adequate land coverage.
- 3). Stratification of smaller inventory areas on basis of physiographic, hydrologic, floral, and other particular and detailed criteria, and plotting of same on maps.
- 4.) Selection of sample size or sample fraction, which will simultaneously consider a number of variables and will be adequate to yield valid conclusions and projections.
- 5). Selection of sampling unit (size and shape, quadrat, transect, etc.).
- 6). Random (stratified random, stratified, other) selection of sampling units for actual survey, being compatible with requirements of defined strata.
- 7). Determination and control of sources of non-sampling error and evaluation of the statistical reliability of the results.

The proposed agency program could be modeled in part after Plog (1978), whose analytic approach to sampling has resulted in a workable survey/inventory strategy that can be applied to the study area.

In so far as a short term program is concerned, an intensive (Class III), systematic survey of, or excavation/collection is recommended for areas currently being subjected to heavy adverse impact from relic collecting and off-road vehicles. Interim programs should be conducted in such a fashion as to be compatible with the proposed long-term inventory program. Interim surveys and excavations/collections can provide agencies with information against which to measure the effectiveness of their long term statistical survey/inventory program.

Management programs for the Carson and Humboldt Sinks regions should consist of both a long and short term survey/inventory component designed to

yield statistically reliable and reproducible data from which to make accurate projections of site distribution and density. The archaeological sites of the study area are both a scientific and public resource, a resource which is rapidly disappearing due to a number of natural and societal factors.

In summary, an intuitive site records analysis has revealed that a large number of aboriginal habitation sites are located in low elevation (less than 4100 feet), lacustrine settings, such as lakeshore, lake terrace, island or rise, and lakebed situations. Significant numbers of archaeological sites were found to be located in a variety of physiographic, ecologic, and elevational settings. The extant site record data-base was found to be biased in favor of easily located and accessible caves, rockshelters, and very large open sites, and cannot be utilized to create a reliable predictive model of site location/distribution for the study area. Proposed statistical sampling inventories would serve both agency and professional interests. No recorded archaeological sites were located as being within the B-20 Air Warfare Range or its proposed boundary extension.

PROPOSED PROJECT AND ALTERNATIVES - CULTURAL RESOURCE IMPACTS

Introduction

As requested by the U.S. Navy, Basin Research Associates has conducted a cultural resource literature and archival records review specific to the B-20 Air Warfare Range and the surrounding region in general. A limited field tour and selected informant interviews supplemented the data gathering and analysis.

The research has indicated that no known historical or archaeological resource properties are present within the current boundaries or proposed extended boundaries of the B-20 Air Warfare Range. However, the archival data research indicates that "Lone Rock," the prime focal point for the Navy fliers practicing bombing and weapons runs, is featured in a local Northern Paiute myth concerning its formation and the surrounding area (cf. Loud and Harrington 1929:161-162; Mythology, this report). As well, local informant data gathered through interviews with several long time residents and collectors indicate the presence of a significant, productive, collecting locality of archaeological materials on the present southern and western (southern $\frac{1}{2}$) boundaries of the B-20 Range. These two factors will be discussed in our "tiering concept" of the alternatives presented below.

Alternative I

The first alternative, the proposed project, could be acceptable if the U.S. Navy cooperates in the procurement of additional on-the-ground information to substantiate the collectors' allegations of significant cultural materials in the vicinity of the B-20 Range. As pointed out in Appendix B, archaeological materials allegedly exist in the vicinity of the southern and western (southern $\frac{1}{2}$) boundaries of the present range. As well, isolated artifactual materials are known to be present from the current bombing range boundary south to the main artifact concentrations in the Stillwater area.

Although some collectors have reported finding archaeological materials on, or in the near vicinity, of "Lone Rock" in the 1930s (pre-USN use of the area), our brief pedestrian reconnaissance in October, 1979 failed to locate any cultural materials. Evidently, any archaeological materials once present at Lone Rock have been severely impacted by the bombing activities.

Based on the information supplied to us, we must recommend that the veracity of the accounts of local collectors be verified via a collector guided tour of the southern and western boundary areas in question. If significant cultural resources are present, suitable mitigation activities, as required by law, must be carried out prior to the annexation of the lands and/or the continuation of bombing activities. In addition, it is strongly recommended, in light of recent Congressional legislation pertaining to Native American sacred places, that the present Native American community be consulted in regard to their feelings towards Lone Rock - a feature in the local Northern Paiute mythology.

Alternative II

The second alternative, reversion of the B-20 Range to the public domain might be acceptable in regards to cultural resources except that a cessation of weapons activities would encourage both the general public and collectors to enter into what was once a reasonably restricted zone due to past military activities. Presumably the Bureau of Land Management (BLM) would then be responsible for the management of any cultural resources present on the B-20 land and the Southern Pacific Land Company would continue its ownership and management of its property.

Alternative III

The third alternative, revision of the B-20 Range boundaries, may be necessary depending on the outcome of the ground reconnaissance recommended and detailed in Alternative I. Until the ground reconnaissance is completed in these potentially sensitive areas, we cannot make any recommendations on boundary revisions.

Alternative IV

The fourth alternative, the relocation of the B-20 operations to other existing ranges would, presumably, cause additional impacts to those ranges. However, since these existing ranges are currently under Navy management and will continue to be for some in the future we cannot speculate as to the current impacts on any cultural resources present on these ranges without a thorough literature/archival review of materials pertinent to these currently unidentified areas.

Alternative V

Alternative five, the creation of an equivalent new range appears to be unacceptable in terms of cultural resources. There are few areas in western Nevada that are free of cultural resources and creation of a new bombing range would create adverse impacts that do not currently exist. Areas where cultural resources are likely to be few in number and insignificant (e.g., steep mountains, talus slopes, etc.) are quite probably unacceptable to the Navy for use in weapons operations, especially training operations. If a new range is created, a literature overview and intensive ground reconnaissance will undoubtedly be required.

Conclusions

It is our opinion that Alternatives I and III are currently the most viable options available to the Navy. A ground reconnaissance by professional archaeologists of the specified "sensitive" areas will confirm the presence/absence of any significant cultural resources. Based on this information, recommendations can be formulated that will allow the Navy to choose an alternative compatible with its future proposed operations at the B-20 Range.

References Cited - Abbreviations Used

AA	American Anthropologist
Am Ant	American Antiquity
C-UCARF	Contributions of the Archaeological Research Facility, University of California, Berkeley
NSM-AP	Nevada State Museum Anthropological Papers, Carson City
SWM	Southwest Museum
-M	Masterkey
-P	Papers
UC	University of California
-AR	Anthropological Records
-PAAE	Publications, American Archaeology and Ethnology
UCAS	University of California Archaeological Survey, Berkeley
-R	Reports
UUAP	University of Utah Anthropological Papers
DRI	Desert Research Institute, Reno
-SSHP	Social Sciences and Humanities Publications



References Cited

- Albright, G.L.
1921 Official Explorations for Pacific Railroads. University of California Press, Berkeley.
- Alcorn, J.R.
1945 The Birds of the Lahontan Valley, Nevada. Condor 48(3):129-138.
- Ambro, R.D.
1966 Two Fish Nets from Hidden Cave, Churchill County, Nevada. UCAS-R 66:101-135.

1970 A Basket Maker's Kit from Lovelock Cave, Nevada. C-UCARF 7:73-79.
- Amsden, C.A.
1937 Lake Mohave Artifacts. SWM-P 11:51-97.
- Angel, M.
1881 History of Nevada. Thompson and West, Publishers, Oakland.
- Anonymous
1862 Map of the Route from Carson City to the Humboldt Mines: August, 1862. (hand drawn) Bancroft Library Collection, University of California, Berkeley.
- Antevs, E.
1945 Correlation of Wisconsin Glacial Maxima. American Journal of Science 243-A:1-39.

1948 Climatic Changes and Pre-White Man. The Great Basin with Emphasis on Glacial and Post-Glacial Times. Bulletin of the University of Utah 38(20):168-191.

1952 Climatic History and the Antiquity of Man in California. UCAS-R 16:23-31.

1953 The Postpluvial or Neothermal. UCAS-R 22:9-23.

1955 Geologic-Climatic Dating in the West. Am Ant 20(4):317-335.
- Aschmann, H.
1958 Great Basin Climates in Relation to Human Occupance. UCAS-R 42:23-40.
- Bancroft, H.H.
1883 The Native Races, Vol. I (Wild Tribes). A.L. Bancroft Company, San Francisco.

- Barber, J.
1928 A History of Duck Decoys. Field and Stream 33(8):32-33, 88-89.
- Bard, J.C.
1979 The Development of a Patination Dating Technique for Great Basin Petroglyphs Utilizing Neutron Activation and X-ray Fluorescence Analyses. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Berkeley.
- Bard, J.C., F. Asaro and R.F. Heizer
1976 Perspectives on Dating of Great Basin Petroglyphs by Neutron Activation Analysis of the Patinated Surfaces. Lawrence Berkeley Laboratory Report 4475.
- 1978 Perspectives on the Dating of Prehistoric Great Basin Petroglyphs by Neutron Activation Analysis. Archaeometry 20(1):85-88.
- Bard, J.C. and C.I. Busby
1974 The Manufacture of Petroglyphs: A Replicative Experiment. C-UCARF 20:83-101.
- Bard, J.C., J.M. Findlay and C.I. Busby
1979 A Class II Cultural Resource Inventory of the Bureau of Land Management, Cinnebar Hill Project Area, Pershing and Churchill Counties, Nevada. Report CR2-307, Bureau of Land Management, Winnemucca District Office.
- Barth, G.
1964 Bitter Strength: A History of the Chinese in the United States 1850-1870. Harvard University Press, Cambridge.
- Basso, D.
1970 Ghosts of Humboldt Region: A Glimpse Into Pershing County's Past. Western Printing and Publishing, Sparks, Nevada.
- Baumhoff, M.A.
1958a Excavation of a Cache Cave in Pershing County, Nevada. UCAS-R 44(2):14-25.
- 1958b History of Great Basin Ethnography. UCAS-R 42:1-6.
- Baumhoff, M.A. and R.F. Heizer
1958 Outland Coiled Basketry from the Caves of West Central Nevada. UCAS-R 42:49-59.
- 1965 Postglacial Climate and Archaeology in the Desert West. IN, H.E. Wright and D.E. Frey (eds.), The Quaternary of the United States. Princeton University Press, Princeton.
- Beatty, C.S. (ed.)
1960 City of the Saints, by Sir Richard Burton. Nevada Historical Society Quarterly 3(2):7-35.

- Bedwell, S.F.
1970 Prehistory and Environment of the Pluvial Fort Rock Lake Area of South Central Oregon. Unpublished Ph.D. dissertation, Department of Anthropology, University of Oregon, Eugene.
- Bennyhoff, J.A.
1958 The Desert West: A Trial Correlation of Culture and Chronology. UCAS-R 42:98-113.
- Bennyhoff, J.A. and R.F. Heizer
1958 Cross-dating Great Basin Sites by Californian Shell Beads. UCAS-R 42:60-92.
- Benson, L.V.
1978 Fluctuations in the Level of Glacial Lake Lahontan for the Period 0-40,000 years B.P. Quaternary Research 9:300-315.
- Bettinger, R.L.
1975 The Surface Archaeology of Owens Valley, Eastern California: Prehistoric Man-Land Relationships in the Great Basin. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Riverside.
- Billings, W.D.
1945 The Plant Associations of the Carson Desert Region, Western Nevada. Butler University Botanical Studies 7:1-35.
- Binford, L.R.
1962 Archaeology as Anthropology. Am Ant 28:217-225.

1968 Archaeological Perspectives. IN, S.R. Binford and L.R. Binford (eds.), New Perspectives in Archaeology, pp. 5-32. Aldine, Chicago.
- Bonham, H.F. Jr.
1965 Brief Resume of the Pre-Quaternary Geology of the Lake Lahontan Area. IN, Guidebook for Field Conference I: Northern Great Basin and California. International Association for Quaternary Research, VIIth Congress, pp. 14-18, Nebraska Academy of Sciences, Lincoln.
- Boothby, H.E.
1888 Ancient Canals in Nevada. American Antiquarian 10(6):380-381.
- Botti, N.
1976a An Archaeological Assessment of Thermal Resources Geothermal Lease Application N-8716, Pershing County, Nevada. Report CR2-61, Bureau of Land Management, Winnemucca District Office.

- Botti, N.
1976b An Archaeological Assessment of Phillips Petroleum Geothermal Lease Applications N-8373, N-8374, Churchill County, Nevada. Report CR2-59, Bureau of Land Management, Winnemucca District Office.
- 1976c Cultural Resources Survey for Oil and Gas/Geothermal Leasing, Brady-Hazen KGRA. Report CR2-50, Bureau of Land Management, Winnemucca District Office.
- 1977 Cultural Resources Survey for Salt Wells Basin Area. Report CR3-154, Bureau of Land Management, Carson City District Office.
- Brodie, F.M. (ed.)
1963 The City of the Saints, and Across the Rocky Mountains to California, by Richard F. Burton. Alfred A. Knopf, New York.
- Browne, R.C.
1972 Nevada Ghost Towns: A Guide to More than 370 Ghost Towns. House of York, New York.
- Bryan, A.L.
1965 Paleo-American Prehistory. Idaho State University Museum Occasional Papers 16.
- 1969 Early Man in America and the Late Pleistocene Chronology of Western Canada and Alaska. Current Anthropology 10(4):339-365.
- Bryan, A.L. (ed.)
1978 Early Man in America: From a Circum-Pacific Perspective. Occasional Papers No. 1 of the Department of Anthropology, University of Alberta, Edmonton.
- Bryan, A.L. and R. Gruhn
1964 Problems Relating to the Neothermal Climatic Sequence. Am Ant 29:307-315.
- Busby, C.I.
1976 Archaeological Investigations at Burnt Cave, 1976. MS on file, Bureau of Land Management, Carson City District Office.
- Busby, C.I. and J.C. Bard
1979 A Class III Cultural Resources Inventory of the Sierra Pacific Power Company's Transmission Line Corridor: Valmy to Mira Loma, Nevada. MS on file, Nevada State Museum and Bureau of Land Management, Winnemucca and Carson City District Offices.

- Busby, C.I. and J.C. Bard
in prep. The Archaeology of Burnt Cave (NV-Ch-54), Churchill County,
Nevada.
- Busby, C.I., R. Fleming, R. Hayes and K. Nissen
1978 The Manufacture of Petroglyphs: Additional Replicative Experiments
from the Western Great Basin. Ballena Press Publications on
North American Rock Art 1:89-108, Socorro, New Mexico.
- Busby, C.I., L.S. Kobori and K.M. Nissen
1975 Eetza Cave: Report of Test Excavations. MS on file, Bureau of
Land Management, Carson City District Office.
- Butcher, D.
1963 Exploring Our National Wildlife Refuges. Houghton, Mifflin Co.,
Boston.
- Byrne, R., C. Busby and R.F. Heizer
in press The Altithermal Revisited: Two Pollen Diagrams from the Leonard
Rockshelter. Journal of California and Great Basin Anthropology.
- Caldwell, W.W. and D.R. Henning
1978 North American Plains. IN, R.E. Taylor and C.W. Meighan (eds.),
Chronologies in New World Archaeology, pp. 113-146. Academic
Press, New York.
- Campbell, E.W.C.
1949 Two Ancient Archaeological Sites in the Great Basin. Science
109(2831):340.
- Campbell, E.W.C. and W.H. Campbell
1940 A Folsom Complex in the Great Basin. SWM-M 13(1):7-11.
- Campbell, E.W.C., et al.
1937 The Archaeology of Pleistocene Lake Mohave. SWM-P 11.
- Campbell, F.
1867 Condition of the Indian Tribes. Report of the Special Joint
Commission of 1865:513-533. GPO, Washington.
- 1866 Report Commissioner of Indian Affairs for 1866, pp. 115-119.
GPO, Washington.
- Carroll, J.E.
1970 Bead Stringing at Lovelock Cave, Nevada. C-UCARF 7:39-43.
- Carter, G.F.
1958 Archaeology in the Reno Area in Relation to Age of Man and the
Culture Sequence in America. Proceedings of the American
Philosophical Society 102(2):174-192.

- Caughey, J. (ed.)
1932 The Emigrants' Guide to California by Joseph E. Ware (1849).
Princeton University Press, Cambridge.
- Clark, B.C.
1928 Diary of a Journey from Missouri to California in 1849.
Missouri Historical Review 23(1):3-14.
- Clewlow, C.W. Jr.
1967 Time and Space Relations of Some Great Basin Projectile Point
Types. UCAS-R 70:141-149.
- 1968a Surface Archaeology of the Black Rock Desert, Nevada. UCAS-R
73:1-94.
- 1968b Projectile Points from Lovelock Cave, Nevada. UCAS-R
71:89-101.
- Clewlow, C.W., Jr. and L.K. Napton
1970 Additional Projectile Points and Lithic Artifacts from Lovelock
Cave, Nevada. C-UCARF 7:64-72.
- Cline, G.
1963 Exploring the Great Basin. Norman: University of Oklahoma Press.
- Cook, S.F.
1941 The Mechanism and Extent of Dietary Adaptation Among Certain
Groups of California and Nevada Indians. University of California
Ibero-Americana 18:1-59.
- Cook, S.F. and R.F. Heizer
1965 The Quantitative Approach to the Relation Between Population
and Settlement Size. UCAS-R 64:1-97.
- Cowan, R.A.
1967 Lake-Margin Exploitation in the Great Basin as Demonstrated by
an Analysis of Coprolites from Lovelock Cave, Nevada. UCAS-R
70:21-35.
- Cowan, R.A. and C.W. Clewlow, Jr.
1968 The Archaeology of Site NV-Pe-67. UCAS-R 73:195-236.
- Creel, C.W.
1964 A History of Nevada Agriculture. University of Nevada Press,
Reno.
- Cressman, L.S.
1956 Additional Radiocarbon Dates, Lovelock Cave, Nevada. Am Ant
21(3):311-312.

Cressman, L.S.

- 1966 Man in Association with Extinct Fauna in the Great Basin.
Am Ant 31(6):866-867.
- 1968 Early Man in Western North America: Perspectives and Prospects.
Eastern New Mexico University Contributions in Anthropology
1(4):78-87.
- 1977 Prehistory of the Far West. Salt Lake City: University of Utah
Press.

Cronquist, A., A.H. Holmgren, N. H. Holmgren and J.L. Reveal

- 1972 Intermountain Flora. Hafner Publishing Company, New York.

Culin, S.

- 1907 Games of the North American Indians. Twenty-Fourth Annual
Report of the Bureau of American Ethnology, 1902-1903. GPO,
Washington.

Curry, R.R.

- 1969 Holocene Climatic and Glacial History of the Central Sierra
Nevada, California. IN, S.A. Schumm and W.C. Bradley (eds.),
United States Contributions to Quaternary Research. Geological
Society of America Special Paper 123.

Curtis, E.S.

- 1926 The North American Indian, Vol. 15. Plimpton Press, Norwood.

Dansie, D.P.

- 1975 John T. Reid's Case for the Redheaded Giants. Nevada Historical
Society Quarterly 18(3):153-167.

Davis, E.L.

- 1970 Archaeology of the North Basin of Panamint Valley, Inyo County,
California. NSM-AP 15:83-141.

Davis, E.L. and R. Shutler, Jr.

- 1969 Recent Discoveries of Fluted Points in California and Nevada.
NSM-AP 14:154-177.

Davis, J.O.

- 1978 Quaternary Tephrochronology of the Lake Lahontan Area, Nevada
and California. Nevada Archaeological Survey Research Paper 7.

Davis, W.A.

- 1965 Computer Analysis of Aboriginal Cordage Data. Paper presented
at the 30th Meeting of the Society for American Archaeology,
Urbana, Illinois.

- Davis, W.A.
1966 Theoretical Problems in Western Prehistory. Desert Research Institute Social Sciences and Humanities Publications 1:147-165.
- d'Azevedo, W.L.
1966 Comments on Tribal Distribution. Desert Research Institute Social Sciences and Humanities Publications 1:315-334.
- de Braga, M.
1964 Dig No Graves. Western Printing and Publishing, Sparks, Nevada.
- Deetz, J.F.
1970 Archaeology as a Social Science. Current Directions in Anthropology 3(2):115-125.
- DeGroot, H.
1863 Map of Reese River Mining Region. (hand drawn) Bancroft Library Collection, University of California, Berkeley.

1864 Map of the State of Nevada. (hand drawn) Bancroft Library Collections, University of California, Berkeley.
- DeQuille, D. (William Wright)
1963 Washoe Rambles. Westernlore Press, Los Angeles.
- Dodge, F.
1859 Report on the Commissioner of Indian Affairs, pp. 362-377. GPO, Washington.
- Douglas, C.L.
1969 Analysis of Hairs in Lovelock Cave Coprolites. Kroeber Anthropological Society Special Publication 2:1-8.
- Douglass, W.A. and J. Bilbao
1975 Amerikanuak; Basques in the New World. University of Nevada Press, Reno.
- Dunbar, H.R.
1975 Archaeological Site Report ArNV-030-14, Open Aboriginal Camp. Bureau of Land Management, Carson City District Office.

1976 Archaeological Survey, Sand Springs Pony Express Station Excavation (Hs-03-6). Report CR3-88, Bureau of Land Management, Carson City District Office.
- Duncan, C.T. (ed.)
1964 An Overland Journey from New York to San Francisco in the Summer of 1859, by Horace Greeley, Alfred A. Knopf.
- Dunn, F.L. and R. Watkins
1970 Parasitological Examination of Prehistoric Human Coprolites from Lovelock Cave, Nevada C-UCARF 10:176-185.

- Dwight, T.T.
1867 Report of the Commissioner of Indian Affairs for 1867, pp. 94-114. GPO, Washington.
- Earl, P.I. (ed.)
1978 Meandering Along the Line of the Central Pacific Railroad, 1868. Nevada Historical Society Quarterly 21(4):279-285.
- Edaburn, S.L. (comp.)
1979 Historic Engineering Sites - Churchill County, Nevada. Churchill County Museum, Fallon, Nevada.
- Elderkin, S.S.
1967 A Short Story Regarding an Early Day Family who Settled in Churchill County, Nevada. Nevada Historical Society, Reno. (manuscript)
- Elliot, R.R.
1973 History of Nevada. University of Nebraska Press, Lincoln.
- Elsasser, A.B.
1958 The Surface Archaeology of Site 26-Pe-5, Pershing County, Nevada. UCAS-R 44(2):26-56.
- Elsasser, A.B. and E.R. Prince
1961 The Archaeology of Two Sites at Eastgate, Churchill County, Nevada. UC-AR 20(4).
- Fay, G.E. (ed.)
1971 Charters, Constitutions and By-Laws of the Indian Tribes of North America, Parts XI and XII, The Basin-Plateau Tribes. Occasional Publications in Anthropology, Ethnology Series 12 and 13. Museum of Anthropology, University of Colorado, Greeley.
- Filson, N.P.
n.d. History Highlights of the Navy in Nevada. Manuscript on file, Nevada Historical Society, Reno.
- Flannery, K.V.
1967 Culture History versus Cultural Process: A Debate in American Archaeology. Scientific American 217(2):119-122.
- Fletcher, F.N.
1929 Early Nevada: The Period of Exploration 1776-1848. Carlisle and Company, Reno.
- Follett, W.I.
1967 Fish Remains from Coprolites and Midden Deposits at Lovelock Cave, Churchill County, Nevada. UCAS-R 70:93-116.

- Follett, W.I.
1970 Fish Remains from Human Coprolites and Midden Deposits Obtained During 1968 and 1969 at Lovelock Cave, Churchill County, Nevada. C-UCARF 10:163-175.
- Forbes, J.D.
1967 Nevada Indians Speak. University of Nevada Press, Reno.
- Fowler, C.S.
1970 Great Basin Anthropology: A Bibliography. Desert Research Institute Social Sciences and Humanities Publication 5.
1977 Ethnography and Great Basin Prehistory. Desert Research Institute Publications in the Social Sciences 12:11-48.
- Fowler, D.D.
1966 Great Basin Social Organization. Desert Research Institute Technical Report Series S-H, Social Sciences and Humanities Publications 1:57-74.
1975 Report on Preliminary Cultural Resources Reconnaissance of the Proposed Salt Wells Basin Geothermal Project, Churchill County, Nevada. Report CR3-33, Bureau of Land Management, Carson City.
- Fowler, D.D. (ed.)
1972 Great Basin Cultural Ecology: A Symposium. Desert Research Institute Publications in the Social Sciences 8.
- Fowler, D.D. and C.S. Fowler (eds.)
1970 Stephen Power's, "The Life and Culture of the Washo and Paiutes." Ethnohistory 17:117-137.
1971 Anthropology of the Numa. Smithsonian Contributions to Anthropology 14.
- Fremont, J.
1845 Report of Exploring Expedition to the Rocky Mountains in the Year 1842 and to Oregon and Northern California in the years 1843-44. Document 174, Senate, 28th Congress, 2nd Session, pp. 1-693.
- Fulton, R.L.
1909 Reminiscences of Nevada. IN First Biennial Report of the Nevad Historical Society, Carson City.
- Galloway, J.D.
1950 The First Transcontinental Railroad, Central Pacific-Union Pacific. Simmons-Boardman, New York.
- Gifford, E.W.
1926 California Anthropometry. UC-PAAE 22:382-383.

- Gilmore, H.W.
1953 Hunting Habits of the Early Nevada Paiutes. *American Anthropologist* 55:148-153.
- Glass, M.E.
1971 The First Nationally Sponsored Arid Land Reclamation Project: The Newlands Act in Churchill County, Nevada. *Nevada Historical Society Quarterly* 14(1):2-12.
- Goss, J.A.
1968 Culture-Historical Inference from Utaztekan Linguistic Evidence. IN E.H. Swanson, Jr. (ed.), *Utaztekan Prehistory*, pp. 1-42. *Occasional Papers of the Idaho State University Museum* 22.
- Goss, J.A.
1977 Linguistic Tools for the Great Basin Prehistorian. *Desert Research Institute Publications in the Social Sciences* 12: 49-70.
- Graham, J.A. and R.F. Heizer
1967 Man's Antiquity in North America: Views and Facts. *Quaternaria* 9:225-235.
- Grant, C., J.W. Baird and J.K. Pringle
1968 Rock Drawings of the Coso Range, Inyo County, California. *China Lake: Maturango Museum Publication* 4.
- Greeley, H.
1868 *Recollections of a Busy Life.* J.B. Ford and Co., New York.
- Grosscup, G.L.
1956 The Archaeology of the Carson Sink Area. *C-UCARF* 33:58-64.
- 1957a A Bibliography of Nevada Archaeology. *C-UCARF* 36:1-55.
- 1957b Grant No. 2173. Excavations in Lovelock Cave, Nevada. *Yearbook of the American Philosophical Society* 1957:377-380.
- 1958 Radiocarbon Dates from Nevada of Archaeological Interest. *C-UCARF* 44:17-31.
- 1960 The Culture History of Lovelock Cave, Nevada. *C-UCARF* 52.
- 1963 Lovelock, Northern Paiute and Culture Change. *Nevada State Museum Anthropological Papers* 9:67-71.
- 1974 Northern Paiute Archaeology. (written in 1954 for Indian Claims Commission). *Paiute Indians IV.* Garland Publishing Inc. New York.

- Grosscup, G.L. and N.L. Roust
1952 Brief Report on Hidden Cave, site NV-Ch-16. C-UCARF MS #171.
- Gunnerson, J.H.
1962 Plateau Shoshonean Prehistory: A Suggested Reconstruction. Am
Ant 28:41-45.
- Hague, A.
1877 West Humboldt Range. IN U.S. Geological Explorations of the
Fortieth Parallel, Vol. II, pp. 713-750. GPO, Washington.
- Hall, E.R.
1946 Mammals of Nevada. University of California Press, Berkeley.
- Hardesty, D.L.
1977 The Archaeology of Sand Springs Express Station. Report CR3-87,
Bureau of Land Management, Carson City District Office.
- Hardesty, D.L. (Ed.)
1978 Historical, Architectural and Archaeological Studies of Fort
Churchill, Nevada. MS on file, Nevada Division of State Parks.
- Harrington, J.
1947 Chauffer for a Mummy. Desert Spotlight 2(4):4,21. Yucca Valley,
California.
- Harrington, M.R.
1925 Notes. (on M.R. Harrington's 1924 expedition to Lovelock Cave,
Nevada). Indian Notes 2(1):82-83, Museum of the American Indian,
Heye Foundation, N.Y.
- 1927 Some Lake-Bed Camp Sites in Nevada. Museum of the American
Indian, Heye Foundation, Indian Notes and Monographs 4(1):40-47.
- 1932 An Indian's Gift. SWM-Masterkey 6(4):123-124.
- 1933 A Cattail Eater. SWM-Masterkey 11:147-149.
- 1941 Ancient Hunters of the Nevada Desert. Desert Magazine, pp. 4-6,
February 1941.
- Harris, R.P.
1973 Nevada Postal History 1861 to 1972. Bonanza Press, Santa Cruz.
- Hasch, V.E.
1913 The Significance of the Nomenclature in Churchill County. IN,
Third Biennial Report of the Nevada Historical Society. State
Printing Office, Carson City.
- Hatoff, B. and N. Botti
1977 An Archaeological Assessment of Temperature Gradient Holes in
the Salt Wells Basin. Report CR3-185, Bureau of Land Management,
Carson City District Office.

- Hatoff, B.W. and T. Ruhstaller
1977 An Archaeological Assessment of the Fallon NAS Powerline Right-of-Way, Churchill County, Nevada. Report CR3-165, Bureau of Land Management, Carson City District Office.
- Hattori, E.M.
1979 An Archaeological and Historical Investigation of the Simpson Pass Area, Churchill County, Nevada. MS on file, Bureau of Land Management, Carson City District Office.
- Haynes, C.V., Jr.
1964 Fluted Projectile Points: Their Age and Dispersion. Science 145: 1408-1413.

1969a The Earliest Americans. Science 166:709-715.

1969b Comments on Early Man in America and the Late Pleistocene Chronology of Western Canada and Alaska, by A.L. Bryan. Current Anthropology 10(4):353-354.
- Heizer, R.F.
1938 A Complete Atlatl Dart from Pershing County, Nevada. New Mexico Anthropologist 2:68-71.

1945 Honey-Dew "Sugar" in Western North America. SWM-M 19(5):140-145.

1951a Preliminary Report on the Leonard Rockshelter Site, Pershing County, Nevada. Am Ant 17(2):89-98.

1951b An Assessment of Certain Nevada, California and Oregon Radiocarbon Dates. Society for American Archaeology Memoirs 8:23-25.

1951c The Sickles in Aboriginal Western North America. Am Ant 16(3): 247-252.

1956 Recent Cave Explorations in the Lower Humboldt Valley, Nevada. C-UCARF 33:50-57.

1960 Notes on Some Paviotso Personalities and Material Culture. NSM-AP 2.

1964 The Western Coast of North America. IN J.D. Jennings and E. Norbeck (eds.), Prehistoric Man in the New World, pp. 117-148. University of Chicago Press, Chicago.

1966 General Comments. Desert Research Institute Social Sciences and Humanities Publications 1:239-247.

1967a Analysis of Human Coprolites from a Dry Nevada Cave. C-UCARF 70:1-20.

Heizer, R.F.

- 1967b (Preface) Preliminary Examination of Prehistoric Human Coprolites from Four Western Nevada Caves. UC-ASR 70:49-52.
- 1969a University of California (Berkeley) Work in Nevada Archaeology 1969. NAS-R 3(5):3-4.
- 1969b Anthropology of Great Basin Coprolites. IN, D. Brothwell and E. Higgs (eds.) Science and Archaeology, 2nd Edition, pps. 244-250.
- 1970a Ethnographic Notes on the Northern Paiute of Humboldt Sink, West Central Nevada. IN E.H. Swanson, Jr. (ed.), Languages and Cultures of Western North America, pp. 232-245. Idaho State University Press, Pocatello.
- 1970b An Ethnographic Sketch of the Paviotso in 1882. C-UCARF 7:55-63.
- 1970c Environment and Culture: The Lake Mohave Case. Southwest Museum Masterkey 44:68-76.

Heizer, R.F. and M.A. Baumhoff

- 1959 Great Basin Petroglyphs and Prehistoric Game Trails. Science 129(3353):904-905.
- 1961 The Archaeology of Two Sites at Eastgate, Churchill County, Nevada I. Wagon Jack Shelter. C-UCARF 20(4).
- 1962 Prehistoric Rock Art of Nevada and Eastern California. University of California Press, Berkeley.
- 1970 Big Game Hunters in the Great Basin: A Critical Review of the Evidence. C-UCARF 7:1-12.

Heizer, R.F., M.A. Baumhoff and C.W. Clewlow, Jr.

- 1968 Archaeology of South Fork Rockshelter (NV-E1-11), Elko County, Nevada. C-UCARF 71:1-58.

Heizer, R.F. and R. Berger

- 1970 Radiocarbon Age of the Gypsum Culture. C-UCARF 7:13-18.

Heizer, R.F. and C.W. Clewlow, Jr.

- 1968 Projectile Points from Site NV-Ch-15, Churchill County, Nevada. C-UCARF 71:59-101.

Heizer, R.F. and T.R. Hester (ed.)

- 1972 Notes on Northern Paiute Ethnography: Kroeber and Marsden Records. Non-Serial Publication of the Archaeological Research Facility, University of California, Berkeley.

- Heizer, R.F. and T.R. Hester
1978 Great Basin. IN R.E. Taylor and C.W. Meighan (eds.), *Chronologies in New World Archaeology*, pp. 147-200. Academic Press, New York.
- Heizer, R.F. and I.W. Johnson
1952 A Prehistoric Sling from Lovelock Cave, Nevada. *Am Ant* 18: 139-147.
- Heizer, R.F. and A.D. Krieger
1956 The Archaeology of Humboldt Cave, Churchill County, Nevada. *UC(PAAE)* 48(1).
- Heizer, R.F. and L.K. Napton
1969 Biological and Cultural Evidence from Prehistoric Human Coprolites. *Science* 165:563-568.
- 1970a Archaeological Investigations in Lovelock Cave, Nevada. *C-UCARF* 10:1-86.
- 1970b Correspondence Concerning the Lovelock Cave Investigations by the University of California in 1912 and 1924, and Preparation of Loud's Final Report. *C-UCARF* 10:131-162.
- Hester, T.R.
1970 A Study of Wear Patterns on Hafted and Unhafted Bifaces from Two Nevada Caves. *C-UCARF* 7:44-54.
- 1973 Chronological Ordering of Great Basin Prehistory. *C-UCARF* 17.
- Hester, T.R. and C.I. Busby
1977 A Note on a Pestle Preform from NV-Ch-15, Churchill County, Nevada. *NAS-R* 10(3):1.
- Hill, L.
n.d. Allen Family. Nevada Historical Society, Reno. (MS).
- Hodge, F.W. (ed.)
1907-1910 Handbook of the American Indians, North of Mexico. Bureau of American Ethnology Bulletin 30 (Parts 1 and 2). GPO, Washington.
- Hopkins, N.A.
1965 Great Basin Prehistory and Uto-Aztecan. *Am Ant* 31:48-60.
- Hopkins, S.W.
1883 Life Among the Piutes: Their Wrongs and Claims. New York.
- Houghton, J.G., C.M. Sakamoto and R.O. Gifford
1975 Nevada's Weathers and Climate. Nevada Bureau of Mines and Geology, Special Publication 2, University of Nevada, Reno.

- Houghton, R.M. (ed.)
1973 Native American Politics: Power Relationships in the Western Great Basin Today. Bureau of Governmental Research, University of Nevada, Reno.
- Hubbs, C.L. and R.R. Miller
1948 The Zoological Evidence: Correlation Between Fish Distribution and Hydrographic History in the Desert Basins of Western United States. IN The Great Basin with Emphasis on Glacial and Post-glacial Times. University of Utah Bulletin 38(20): 18-166.
- Huckaby, J.
1959 A Miracle of Nature. Nevada Historical Society, Reno. (MS)
- Hulse, J.W.
1978 The Nevada Adventure: A History. University of Nevada Press, Reno.
- Hunt, A.P.
1960 Archaeology of the Death Valley Salt Pan. UUAP 47.
- Hurt, G.
1859 Report of the Commissioner of Indian Affairs for 1859, pg. 21. GPO, Washington.
- Irwin-Williams, C.
1967 Associations of Early Man with Horse, Camel and Mastadon at Heuyatlaco, Valsequillo (Puebla Mexico). IN P.S. Martin and H.E. Wright, Jr. (eds.), Pleistocene Extinctions: The Search for a Cause. Yale University Press, New Haven.

1968 Archaeological Evidence of Early Man in Mexico. Eastern New Mexico University Contributions in Anthropology 1(4):39-41.
- Jennings, J.D.
1953 Danger Cave: A Progress Summary. El Palacio 60:179-213.

1957 Danger Cave. UUAP 27.

1964 The Desert West. IN J.D. Jennings (ed.), Prehistoric Man in the New World, pp. 149-174. University of Chicago Press, Chicago.

1966 Early Man in the Desert West. Quaternaria VIII (15):81-88.

1973 The Short Useful Life of a Simple Hypothesis. Tebiwa 16(1):1-9.
- Jennings, J.D. and E. Norbeck
1955 Great Basin Prehistory. Am Ant 21(1):1-11.
- Jennings, J.D., et al.
1956 The American Southwest: A Problem in Cultural Isolation. Seminars in Archaeology:1955. Society for American Archaeology Memoir 11: 59-128.

- Jenson, P.M. and P.R. Reed
1979 An Anthropological Overview and Cultural Resources Inventory of the Northern Sacramento Valley and Southern Cascade Range. Bureau of Land Management, Redding (California) District Office.
- Jerrums, W. and M. Rusco
1976 Archaeological Resources Short Report for Bendix Corp., Swingle Bench. Report 1-31, Nevada State Museum, Carson City.
- Johnson, E.C.
1975 Walker River Paiutes, A Tribal History. University of Utah Printing Service, Salt Lake City.
- Johnson, M.G.
1977 Geology and Mineral Deposits of Pershing County, Nevada. Bulletin 89, MacKay School of Mines, University of Nevada, Reno and Nevada Bureau of Mines and Geology.
- Jones, A.C., J.R. Weaver and F.H. Stross
1967 Note on Indian Woodcarving in the Form of a Grasshopper Found in Lovelock Cave, Nevada. UCAS-R:123-128.
- Kelly, I.T.
1932 Ethnography of the Surprise Valley Paiute. UC(PAAE) 31(3).

1938 Northern Paiute Tales. The Journal of American Folk-lore 51(202):363-438.
- Kennedy, K.A.R.
1959 The Aboriginal Population of the Great Basin. UCAS-R 45.
- Kern, E.M.
1876 Journal of Mr. Edward Kern of an Exploration of Mary's or Humboldt River, Carson Lake and Owens River and Lake. Appendix Q IN Report of Explorations Across the Great Basin of the Territory of Utah for a Direct Wagon Route from Camp Floyd to Genoa, in Carson Valley, in 1859 by Capt. J.H. Simpson. GPO, Washington.
- Kobori, L.S.
1976 The Occurrence of Ovis canadensis from an Archaeological Deposit in the Carson Lake Region of Western Nevada. NAS-R 9(3):1-6.
- Krieger, A.D.
1944 Review of "Archaeological Researches in the Northern Great Basin" by Cressman, et al. Am Ant 9:351-359.

1962 The Earliest Cultures in the Western United States. Am Ant 28(2): 138-143.

1964 Early Man in the New World. IN J.D. Jennings and E. Norbeck (eds.) Prehistoric Man in the New World, pp. 23-81. University of Chicago Press, Chicago.

- Kroeber, A.L.
1907 The Washo Language of East Central California and Nevada. UC(PAEE) 4(5):251-318.
- 1925 Handbook of the Indians of California. Bureau of American Ethnology Bulletin 78. GPO, Washington.
- 1934 Uto-Aztecan Languages of Mexico. Ibero-Americana 8:1-27.
- 1957 Ethnographic Interpretations 1-6. UC(PAAE) 47(2):191-234.
- Lamb, S.M.
1958 Linguistic Prehistory in the Great Basin. International Journal of American Linguistics 24(2):95-100.
- 1964 The Classification of the Uto-Aztecan Languages: A Historical Study. University of California Publications in Linguistics 34:106-125.
- Lanning, E.P.
1963 Archaeology of the Rose Spring Site INY-372. UC(PAAE) 49(3): 237-336.
- La Rivers, I.
1962 Fishes and Fisheries of Nevada. Nevada State Fish and Game Commission Publication 401.
- Laycock, G.
1973 The Sign of the Flying Goose: The Story of our National Wildlife Refuges. Anchor Books, Garden City.
- Leonard, Z.
1904 Adventures of Zenas Leonard, Fur Trader and Trapper, 1831-1836. Ed. by W.F. Wagner, M.D. The Burrows Brothers Co., Cleveland.
- 1934 Narrative of the Adventures of Zenas Leonard, Written by Himself. Lakeside Press, Chicago.
- 1959 The Adventures of Zenas Leonard, Fur Trader. (J.C. Ewers, ed.). University of Oklahoma Press, Norman.
- Leone, M.P.
1972 Issues in Anthropological Archaeology. IN M.P. Leone (ed.), Contemporary Archaeology. Southern Illinois University Press, Carbondale.
- Lincoln, F.C.
1923 Mining Districts and Mineral Resources of Nevada. Nevada Newsletter Publishing Co., Reno
- Lingenfelter, R.E. (ed.)
1963 Washoe Rambles, by Dan DeQuille (William Wright). (1861). Westernlore Press, Los Angeles.

- Linsdale, J.M.
1936 The Birds of Nevada. Pacific Coast Avifauna 23. Cooper Ornithological Club, Berkeley.
- Longacre, W.A.
1970 Archaeology as Anthropology: A Case Study. Anthropological Papers of the University of Arizona 17.
- Loud, L.L. and M.R. Harrington
1929 Lovelock Cave. UC(PAAE) 25(1).
- Lowie, R.H.
1924a Notes on Shoshonean Ethnography. Anthropological Papers of the American Museum of Natural History XX(III).

1924b Shoshonean Tales. The Journal of American Folk-lore 37(143-144): 1-242.
- Mack, E.M.
1936 Nevada: A History of the State from the Earliest Times Through the Civil War. Arthur H. Clark, Glendale, California.
- MacNeish, R.S.
1958 Preliminary Archaeological Investigations in the Sierra de Temaulipas, Mexico. American Philosophical Society Transactions 48(6).

1961 First Annual Report of the Tehuacan Archaeological-Botanical Project, R.S. Peabody Foundation, Andover.

1962 Second Annual Report of the Tehuacan Archaeological-Botanical Project, R.S. Peabody Foundation, Andover.

1976 Early Man in the New World. American Scientist 64(3):316-327.
- Mallery, G.
1886 Pictographs of the North American Indians--Preliminary Paper. Fourth Annual Report, Bureau of American Ethnology:13-264. GPO, Washington.
- Malouf, C.I.
1966 Ethnohistory in the Great Basin. IN, W.L. d'Azevedo, et al. (eds.), The Current Status of Anthropological Research in the Great Basin: 1964. DRI- SSHP 1:1-28.
- Martin, A.
1922 Nevada, Beautiful Desert of Buried Hopes. Nation Magazine 115:88-92.
- McCarran, S.M.P.
1969 Patrick Anthony McCarran, Part II. Nevada Historical Society Quaterly 12(1):35-75

- McGee, W.J.
1889 An Obsidian Implement from Pleistocene Deposits in Nevada.
AA 2(4):301-312.
- Mehring, P.J., Jr.
1977 Great Basin Late Quaternary Environments and Chronology.
Desert Research Institute Publications in the Social Sciences
12:113-168.
- Meighan, C.W.
1959 Varieties of Prehistoric Cultures in the Great Basin Regions.
SWM-Masterkey 33(2):46-58.
- 1961 The Growth of Archaeology in the West Coast and the Great Basin,
1935-1960. Am Ant 27(1):33-38.
- 1963 Pre-Milling Stone Cultures. NSM-AP 9:78-80.
- 1978 California. IN R.E. Taylor and C.W. Meighan (eds.), Chronologies
in New World Archaeology, pp. 223-240. Academic Press, New York.
- Meighan, C.W. and C.V. Haynes, Jr.
1968 New Studies in the Age of the Borax Lake Site. SWM-M 42(1):
4-9.
- 1970a The Borax Lake Site Revisited. Science 167:1213-1221.
- 1970b Further Investigations of Borax Lake. SWM-M 44(3):112-113.
- Merrill, C.H.
1898 Life Zones and Crop Zones of the United States. Bulletin of
the United States Biological Survey 10, Washington, GPO.
- Miller, W.R.
1966 Anthropological Linguistics in the Great Basin. Desert
Research Institute Social Sciences and Humanities Publications
1:75-112.
- Morbeck, M.E.
1970 Description of Skeletal Material Found in Lovelock Cave
(NV-Ch-18) in 1969. UC-CARF 10:191-197.
- Mordy, B.D. and D.L. McCaughey
1968 Nevada Historical Sites. Desert Research Institute, University
of Nevada, Reno.
- Morgan, D.
1943 The Humboldt, Highroad of the West. Rinehart and Co., New York.
- Morgan, D. (ed.)
1963 Travelers' Guide Across the Plains Upon the Overland Route to
California by P.L. Platt and N. Slater, A.M. (1852). John
Howell, San Francisco.

Morrison, R.B.

- 1961 Lake Lahontan Stratigraphy and History in the Carson Desert (Fallon) Area, Nevada. U.S.G.S. Professional Paper 424-D: 111-114.
- 1964 Lake Lahontan: Geology of Southern Carson Desert, Nevada. U.S.G.S. Professional Paper 401.

Murdock, G.P. and T.J. O'Leary

- 1975 Ethnographic Bibliography of North America. Volume 3: Far West and Pacific Coast. Human Relations Area Files Press, New Haven.

Myrick, D.F.

- 1962 Railroads of Nevada and Eastern California, 2 v. Howell-North, Berkeley (v.1).
- 1969 Refinancing and Rebuilding the Central Pacific. Golden Spike Symposium, Salt Lake City.

Napton, L.K.

- 1969 The Lacustrine Subsistence Pattern in the Desert West. Kroeber Anthropological Society Special Publication 2:28-97.
- 1970 Archaeological Investigations in Lovelock Cave, Nevada. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Berkeley.
- 1971a University of California, Berkeley, Archaeological Research in Western Nevada During the Field Season of 1971. Report CR3-27, Bureau of Land Management, Carson City District Office.
- 1971b Archaeological Research in Nevada by the University of California, Berkeley, Summer 1971. NAS-R 5(6):3-5.
- 1978 Sacramento Canyon Cultural Resource Mitigation: Preliminary Report. MS on file with Sierra Pacific Power Company, Reno.

Napton, L.K. and O.A. Brunetti

- 1969 Paleo-ornithology of Lovelock Cave Coprolites. Kroeber Anthropological Society Special Publication 2:9-18.

Napton, L.K. and R.F. Heizer

- 1969 Introduction. Archaeological and Paleobiological Investigations in Lovelock Cave, Nevada. Kroeber Anthropological Society Special Publication 2:i-v.
- 1970 Analysis of Human Coprolites from Archaeological Contexts, With Primary Reference to Lovelock Cave, Nevada. C-UCARF 10:87-130.

Napton, L.K. and G. Kelso

- 1969 Preliminary Palynological Analysis of Lovelock Cave Coprolites. Kroeber Anthropological Society Special Publication 2:19-27.

- Natches, G.
1923 Northern Paiute Verbs. UC-PAAE 20:243-259.
- Nelson, J.
n.d. Ninety-four Years on the Carson River. Nevada Historical Society, Reno (manuscript).
- Nevada Emigrant Trail Marking Committee
1975 The Overland Emigrant Trail to California: A Guide to Trail Markers Placed in Western Nevada and the Sierra Nevada Mountains in California. Nevada Historical Society, Reno.
- Nevada State Bureau of Immigration (comp.)
1894 Nevada and Her Resources. A Brief Sketch of the Advantages and Possibilities of the State, and the Opportunities and Inducements Offered to Capitalists and Homeseekers. State Printing Office, Carson City.
- Nevada State Inspector of Mines
1909 Nevada's Mineral Resources, compiled by E.E. Stuart. State Printing Office, Carson City.
- Nevada State Writers' Project
1941 Origin of Place Names, Nevada.
- Nissen, K.M.
1971 A Survey of Petroglyphs in the Fallon Area. NAS-R 5:4-5.
1975a Petroglyph Survey in the Western Great Basin. NAS-R 8(2): 7-10.
1975b A New Style of Rock Art in the Great Basin: The Stillwater Facetted Style. NAS-R 8(2):10-11.
1977 Grimes Point Revisited: Are Petroglyph Sites to be Art Museums and Remain Archaeological Mysteries? NAS-R 10(3): 12-14.
1979 Images from the Past: An Analysis of Six Western Great Basin Petroglyph Sites. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Berkeley (in preparation).
- O'Connell, J.
1967 Elko Eared/Elko Corner-Notched Projectile Points as Time Markers in the Great Basin. UC-ASR 73:129-140.
- O'Neale, L.M.
1947 Note on an Apocynum Fabric. Am Ant 13(2):179-180.
- Orchard, W.C.
1925 Porcupine Quillwork from Lovelock Cave, Nevada. Museum of the American Indian, Heye Foundation, Indian Notes 2(3):187-190.

- Paher, S.W.
1970 Nevada Ghost Towns and Mining Camps. Howell-North, Berkeley.
- Park, W.Z.
1934 Paviotso Shamanism. AA 36:98-113.
- 1938a The Organization and Habitat of Paviotso Bands. AA 40(4):
622-626.
- 1938b Shamanism in Western North America. Northwestern University
Studies in the Social Sciences 2.
- Payne, J.A.
1859 Saint Louis to San Francisco, Being an Account of a Journey
Across the Plains in 1850 together with my Experience in
Steamboating on the California Rivers until the Fall of 1853,
by Captain James A. Payne. Nevada Historical Society, Reno
(manuscript).
- Plog, F. (ed.)
1978 An Analytical Approach to Cultural Resource Management: The
Little Colorado Planning Unit. Arizona State University
Anthropological Research Paper 13 and USDA Forest Service
Cultural Resources Report 19.
- Putnam, L.
1876 Sketch of Routes for Camp Floyd to Carson Valley U.T. Explored
by Capt. J. H. Simpson. IN, United States Army Engineer
Department, Report of Explorations across the Great Basin
of the Territory of Utah for a Direct Wagon-Route from Camp
Floyd to Genoa, in Carson Valley, in 1859, by Captain J. H.
Simpson. Washington D.C.
- Quaife, M.M. (ed.)
1978 Narrative of the Adventures of Zenas Leonard. University of
Nebraska Press, Lincoln.
- Radovsky, F.J.
1970 Mites Associated with Coprolites and Mummified Human Remains
in Nevada. UC-CARF 10:186-199.
- Rand, McNally and Company
1876 Trans Continental Route. Illustrated Crossing of the
Switzerland of America. Panoramic Map of the Great Overland
Route from Occident to Orient, Europe to China, Japan and
Australia. Chicago.
- 1896 A Correct Map of the United States Showing the San Francisco
Overland Route and Connections. Chicago.
- Ranere, A.J.
1970 Prehistoric Environments and Cultural Continuity in the
Western Great Basin. Tebiwa 13(2):52-73.

- Redman, C.L.
1973 Research and Theory in Current Archaeology: An Introduction. In, C.L. Redman (ed.), Research and Theory in Current Archaeology, pp. 5-20. John Wiley and Sons, New York.
- Remy, J. and J. Brenchley
1861 A Journey to Great-Salt-Lake City, with a sketch of the History, Religion and Customs of the Mormons, and an introduction on the Religious Movement in the United States, 2 volumes. London.
- Robertson, C.
1977 After the Drying Up of the Water: The Fallon Paiute-Shoshone. Duck Down Press, Fallon.
- Rogers, M.J.
1939 Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. San Diego Museum of Man Paper 3.
- Rohn, A.H.
1978 American Southwest. IN, R.E. Taylor and C.W. Meighan (eds.), Chronologies in New World Archaeology, pp. 201-222. Academic Press, New York.
- Roney, J., D. Brooks, and R. Timmons
1977 Cultural Resources Survey for Geothermal Leasin Near Fallon, Nevada. Report CR2-164 Bureau of Land Management, Winnemucca District Office.
- Rouse, I.
1976 Peopling of the Americas. Quaternary Research 6:597-612.
- Roust, N.L.
1966 The Archaeology of Granite Point, Pershing County, Nevada. UC-ASR 66:37-72.

1967 Preliminary Examination of Prehistoric Human Coprolites From Four Western Nevada Caves. UC-ASR 70:49-88.
- Roust, N.L. and C.W. Clewlow
1968 Projectile Points from Hidden Cave (NV-Ch-16), Churchill County, Nevada. UC-ASR 71:103-116.
- Roust, N.L. and G.L. Grosscup
1957 Archaeology of Hidden Cave (NV-Ch-16), Nevada. Ms. # 171, University of California, Archaeological Research Facility (In Press, Contributions of the University of California Archaeological Research Facility).
- Rozaire, C.E.
1963 Lake-Side Cultural Specialziations in the Great Basin. NSM-AP 9:72-77.

- Rusco, M.
1973 Indian Tribal Governments in Nevada. IN, R.M. Houghton (ed.), Native American Politics: Power Relationships in the Western Great Basin Today, pp. 88-97. Bureau of Governmental Research, University of Nevada, Reno.
- 1975 Archaeological and Historic Investigation at Sites Along the Lovelock-Woolsey Section, I-80: Progress Report. Nevada State Museum Cultural Resource Report 31-C.
- Rusco, M. and E. Seelinger
1974 Report of Archaeological Reconnaissance Along Proposed 230 KV Transmission Line Right-of-Way of Sierra Pacific Power Company, Part I: Tracy, Nevada to Valmy, Nevada. Ms. on file at the Nevada State Museum, Carson City.
- Rusco, M. and D.R. Tuohy
n.d. Archaeological Assessment of Five Sierra Pacific Potential Power Plant Sites in the State of Nevada. Report CR2-10, Bureau of Land Management, Winnemucca District Office.
- Russell, I.C.
1885 Geological History of Lake Lahontan, A Quaternary Lake of Northwestern Nevada. USGS Monograph 11. GPO, Washington.
- Sabloff, J. and G.R. Willey
1967 The Collapse of Maya Civilization in the Southern Lowlands: A Consideration of History and Process. Southwestern Journal of Anthropology 23:311-336.
- Schoolcraft, H.R.
1851 Historical and Statistical Information Respecting the History, Condition, and Prospects of the Indian Tribes of the United States (6 vols.). Philadelphia.
- Scott, L.
1966 Karnee, A Paiute Narrative. University of Nevada Press, Reno.
- Service, E.R.
1962 Primitive Social Organization, An Evolutionary Perspective. Random House, New York.
- Setzler, F.M.
1953 A Prehistoric Cave Culture in Southwestern Texas. AA 37(1): 104-110.
- Shantz, H.L.
1925 Plant Communities in Utah and Nevada. IN, I. Tidestrom, Flora of Utah and Nevada, Contributions from the United States National Herbarium 25:15-23. GPO, Washington.

- Shepperson, W.
1964 Retreat to Nevada. University of Nevada Press, Reno.
- Shimkin, D.B. and R.M. Reid
1970 Socio-cultural Persistence Among Shoshoneans of the Carson River Basin (Nevada). IN E.H. Swanson, Jr. (ed.), Languages and Cultures of Western North America, pp. 172-200. Idaho State University Press, Pocatello.
- Shutler, M.E. and R. Shutler, Jr.
1959 Clovis-like Points from Nevada. SWM-M 33(1):30-32.
- Shutler, R. Jr.
1961 Correlation of Beach Terraces with Climatic Cycles of Pluvial Lake Lahontan, Nevada. Annals of the New York Academy of Sciences 95(1):513-520.

1968 The Great Basin Archaic. Eastern New Mexico University Contributions in Anthropology 1(3):24-26.
- Simpson, J.H.
1876 Report of Explorations across the Great Basin of the Territory of Utah for a Direct Wagon-Route from Camp Floyd to Genoa, in Carson Valley, in 1859. United States Army Engineer Department, Washington, D.C.
- Smith, J.E. and A.B. Elsasser
1962 Test Excavation of Cave Rock, Nevada. Kroeber Anthropological Society Papers 27:45-48.
- Smith, J.U. (ed.)
1911 John C. Fremont's Expedition in Nevada, 1843-1844. IN, Second Biennial Report of the Nevada Historical Society. State Printing Office, Carson City.
- Smythe, W.E.
1900 The Conquest of Arid America. Harper and Brothers, New York.
- Stanley, D.A., G.M. Page and R. Shutler, Jr.
1970 The Cocanour Site: A Western Nevada Pinto Phase Site with Two Excavated "House Rings". NSM-AP 15:1-46.
- Stebbins, R.
1966 A Field Guide to Western Reptile and Amphians. Houghton, Mifflin, Co., Boston.
- Steward, J.H.
1929 Petroglyphs Of California And Adjoining States. UC-PAAE 24(2):47-238.

1936 Myths of the Owens Valley Paiute. UC-PAAE 35(5):355-440.

- 1937 Linguistic Distributions and Political Groups of the Great Basin Shoshoneans. AA 39(4):625-634..
- 1938 Basin-Plateau Aboriginal Sociopolitical Groups. Bureau of American Ethnology Bulletin 120. GPO, Washington.
- 1940 Native Cultures of the Intermontane (Great Basin) Area. IN, Essays in Historical Anthropology of North America. Smithsonian Miscellaneous Collections 100:445-502.
- 1955 Theory of Culture Change. University of Illinois, Urbana.
- 1970 The Foundations of Basin-Plateau Shoshonean Society. IN, E.H. Swanson, Jr. (ed.), Languages and Cultures of Western North America, pp. 113-151. Idaho State University Press, Pocatello.
- Steward, J.H. and E. Wheeler-Voegelin
1974 The Northern Paiute Indians. IN, D.A. Horr (comp. and ed.), American Indian Ethnohistory, California and Basin-Plateau Indians, Paiute Indians III. Garland Publishing Inc., New York.
- Stewart, O.C.
1939 The Northern Paiute Bands. UC-AR 2(3):127-149.
- 1941 Culture Element Distributions: XIV, Northern Paiute. UC-AR 4(3):361-446.
- 1966 Tribal Distributions and Boundaries in the Great Basin. DRI-SSHP 1:167-238.
- Strobridge, I.M.
1899 The Happy Hunting Ground: A Piute Doctrine. Land of Sunshine XI(1):21-24.
- Swadesh, M.
1964 Linguistic Overview. IN J.D. Jennings and E. Norbeck (eds.), Prehistoric Man in the New World. University of Chicago Press, Chicago.
- Swanson, E.H., Jr.
1966 The Geographic Foundations of the Desert Culture. DRI-SSHP 1:137-146.
- Tadlock, W.L.
1966 Certain Crescentic Stone Objects as a Time Marker in the Western United States. Am Ant 31(5):662-675.
- Taylor, W.W.
1961 Archaeology and Language in Western North America. Am Ant 27: 71-81.

Thomas, D.H.

- 1969 Great Basin Hunting Patterns: A Quantitative Method for Treating Faunal Remains. *Am Ant* 34(4):392-401.
- 1970 Archaeology's Operational Imperative: Great Basin Projectile Points as a Test Case. University of California Archaeological Survey Annual Report 12:27-60, Los Angeles.
- 1971 Prehistoric Subsistence-Settlement Patterns of the Reese River Valley, Central Nevada. Unpublished Ph.D. dissertation, University of California, Davis.
- 1972 Western Shoshone Ecology: Settlement Patterns and Beyond. Desert Research Institute Publications in the Social Sciences 8:135-153.
- 1973 An Empirical Test for Steward's Model of Great Basin Settlement Patterns. *Am Ant* 38(2):155-176.

Thompson, R.H.

- 1972 Interpretive Trends and Linear Models in American Archaeology. IN M.P. Leone (ed.), *Contemporary Archaeology*, pp. 34-38. Southern Illinois University Press, Carbondale.

Totton, K.

- 1978 The History of Fort Churchill, Nevada. IN D.L. Hardesty, (ed.), *Historical, Architectural, and Archaeological Studies of Fort Churchill, Nevada*. Nevada Division of State Parks.

Townley, J.M.

- 1977 Turn This Water Into Gold: The Story of the Newlands Project. Nevada Historical Society, Reno.

Tubbs, D. and R. Berger

- 1967 The Viability of Pathogens in Ancient Human Coprolites. *UC-ASR* 70:89-92.

Tuohy, D.R.

- 1963 Archaeological Survey in Southwestern Idaho and Northern Nevada. *NSM-AP* 8.
- 1965 Nevada's Prehistoric Heritage. Nevada State Museum, Popular Series, no. 1.
- 1968a Some Early Lithic Sites in Western Nevada. *Eastern New Mexico University Contributions in Anthropology* 1(4):27-38.
- 1968b A "Scottsbluff" Point from the Black Rock Desert. *NAS-R* 2(9-10):6-9.
- 1969a The Test Excavation of Hanging Rock Cave, Churchill County, Nevada. *NSM-AP* 14:26-69.

- 1969b Breakage, Burin Facets and the Probable Linkage Among Lake Mohave, Silver Lake and Other Varieties of Paleo-Indian Projectile Points in the Desert West. NSM-AP 14:133-144.
- 1970a Notes on a Collection of California Shell Beads from the Humboldt Sink Area. NAS-R 4(1):4-9.
- 1970b The Coleman Locality: A Basalt Quarry and Workshop Near Falcon Hill, Nevada. NSM-AP 15:143-206.
- 1974a In the Path of Electrical Energy. Nevada Archaeologist 2(1):18-23.
- 1974b A Comparative Study of Late Paleo-Indian Manifestations in the Western Great Basin. Nevada Archaeological Survey Research Paper 5:91-116.

Turner, C.G. II

- 1967 Bite-Marks in Tule Quids of Prehistoric Nevada Indians. UC-ASR 70:117-122.

Underhill, R.

- 1941 The Northern Paiute Indians of California and Nevada. United States Department of the Interior, Branch of Education, Bureau of Indian Affairs, Washington, D.C.

United States Department of Agriculture - Nevada Humboldt River Basin Survey Field Party

- 1965 Lovelock Sub-Basin. Humboldt River Basin Survey, Water and Land Resources Report 11.

United States Department of Commerce

- 1974 Federal and State Indian Reservations and Indian Trust Areas. GPO, Washington.

United States Department of the Interior, Bureau of Land Management

- 1976a Nevada State Museum Archaeological Site Inventory Record for Site BLM Hs27-02-13, the Desert Queen Mine. Bureau of Land Management, Winnemucca District Office.
- 1976b The Pony Express in Nevada. Harrah's Club, Reno. Publication on file with Bureau of Land Management, Carson City and Winnemucca District Offices.

United States Department of the Interior, Bureau of Mines

- 1940 Reconnaissance of Mining Districts in Churchill County, Nevada by W.O. Vanderburg. Information Circular 7093, Bureau of Mines, Washington, D.C.

United States Department of the Interior, Bureau of Reclamation

- 1942 Reclamation Handbook: A compendium of information on the reasons for and the development, operations, and results of conserving water and reclaiming land in the western United States. GPO, Washington.

- United States Department of Interior, Fish and Wildlife Service
1976 Final Environmental Statement: Operation of the National
Wildlife Refuge System.
- United States Department of the Interior, General Land Office
1876 State of Nevada (map). Julius Bien, New York.
1886 State of Nevada (map). Julius Bien, New York.
- United States Department of the Interior, United States Geological Survey
1883 Mineral Resources of the United States, 1882. GPO, Washington.
1885 Geological History of Lake Lahontan, A Quaternary Lake of
Northwestern Nevada by I. Russel. GPO, Washington.
1909 Mineral Resources of the United States, 1908, 2 vols.
GPO, Washington (v.1.).
1910 Topographic map of the Carson Sink Quadrangle, Nevada.
1915 Guidebook of the Western United States. Part B. The Overland
Route With a Side Trip to Yellowstone Park by W.T. Lee et al.
Bulletin 612, GPO, Washington.
1919 Salt Resources of the United States by W.C. Phalen. Bulletin
669, GPO, Washington.
1951a Map of Desert Peak Quadrangle, Churchill County, Nevada.
15 Minute Series (Topographic). GPO, Washington.
1951b Map of Carson Sink Quadrangle, Churchill County, Nevada.
15 minute Series (Topographic). GPO, Washington.
- United States Department of the Navy, Bureau of Yards and Docks
1947 Building the Navy's Bases in World War II: History of the
Bureau of Yards and Docks and the Civil Engineering Corps,
1940-1946, 2 v. GPO, Washington (v. 1).
- United States Post Office Department
1898 Post Route Map of the States of California and Nevada
Showing Post Offices with the Intermediate Distances on
Mail Routes in Operation on the 1st of December, 1897.
- United States Surveyor General Office
1882a Map of Township 24 North, Range 29 East, Mount Diablo Meridian.
1882b Map of Township 23 North, Range 29 East, Mount Diablo Meridian.
1890a Map of Township 23 North, Range 28 East, Mount Diablo Meridian.
1890b Map of Township 24 North, Range 28 East, Mount Diablo Meridian.

- 1902 Mineral Survey plats for Kinney Salt Works, Churchill County, Nevada.
- 1908 Mineral Survey plats for the August and Uline Lodes, Churchill County, Nevada.
- 1911 Mineral Survey plats for Jessup area mines, Churchill County, Nevada.
- United States Treasury Department
1868 Report of J. Ross Browne on the Mineral Resources of the States and Territories West of the Rocky Mountains. GPO, Washington.
- Van Denburgh, J.
1922 Reptiles of Western North America. Occasional Papers of the California Academy of Sciences 10.
- Voorhis, L.
n.d. A Historical Landmark in my Vicinity. Nevada Historical Society, Reno (manuscript).
- Wallace, W.J.
1958 Archaeological Investigations in Death Valley National Monument 1952-1957. UCAS-R 42:7-22.
- 1962 Prehistoric Cultural Development in the Southern California Deserts. Am Ant 28(2):172-180.
- Warren, C.N.
1967 The San Dieguito Complex: A Review and Hypothesis. Am Ant 32(2):168-185.
- Warren, C.N. and J. DeCosta
1964 Dating Lake Mohave Artifacts and Beaches. Am Ant 39(2): 206-209.
- Warren, C.N. and H.T. Ore
1978 Approach and Process of Dating Lake Mohave Artifacts. Journal of California Anthropology 5(2):179-187.
- Warren, C.N. and A.J. Ranere
1968 Outside Danger Cave: A View of Early Man in the Great Basin. Eastern New Mexico University Contributions in Anthropology 1(4):6-18.
- Warren, C.N. and D.L. True
1961 The San Dieguito Complex and Its Place in California Prehistory. University of California Archaeological Survey, Annual Report 1960-61:246-338. Los Angeles.

- Wasson, W.
1861 Reports, Commissioner of Indian Affairs, pp. 110-116.
GPO, Washington.
- Watson, D.S.
1934 West Wind: The Life Story of Joseph Reddeford Walker, Knight
of the Golden Horseshoe. Percy Booth, Los Angeles.
- Watson, P.J., S.A. LeBlanc and C.L. Redman
1971 Explanation in Archaeology, An Explicitly Scientific Approach.
Columbia University Press, New York.
- Weide, D.L.
1976 The Altithermal as an Archaeological 'Non Problem' in the
Great Basin. Nevada Archaeological Survey Research Paper
6:174-184.
- Weide, D.L. and M.L. Weide
1977 Time, Space and Intensity in Great Basin Paleoecological
Models. Desert Research Institute Publications in the Social
Sciences 12:79-112.
- Welliver, A (ed.)
1967 Diary of S.M. Jamison 1850. Nevada Historical Society
Quarterly 10(4):18-21.
- Wells, A.J.
1911 Nevada. Southern Pacific Railroad Co. Passenger Department,
San Francisco.
- Weltfish, G.
1930 Prehistoric North American Basketry Technique and Modern
Distributions. AA 32(3):454-495.
- 1932a Problems in the Study of Ancient and Modern Basket Makers.
AA 34(1)L108-117.
- 1932b Preliminary Classification of Prehistoric Southwestern
Basketry. Smithsonian Miscellaneous Collections 87(7):1-47.
- 1953 The Origins of Art. Bobbs-Merrill Co. Inc. pp. 1-300.
- Wendorf, E
1966 Early Man in the New World: Problems of Migration. American
Naturalist 100(912):253-270.
- Wheat, M.M.
1959 Notes on Paviotso Material Culture No. 1 NSM-AP 1.
- 1967 Survival Arts of the Primitive Paiutes. University of Nevada,
Reno.

- Wheeler, S.M.
1940 Archaeological Fieldwork June 6 to November 18, 1940, Churchill County, Nevada. Nevada State Park Commission, (mimeographed), Carson City.
- Wheeler, S.M. and G.N. Wheeler
1969 Cave Burials Near Fallon, Churchill County, Nevada. Nevada State Park Commission, (mimeographed), Carson City. Reprinted NSM-AP 14:72-80.
- Wheeler, S.S.
1971 The Nevada Desert. Caxton Printers, Caldwell.
- Willden, R. and R.C. Speed
1974 Geology and Mineral Deposits of Churchill County, Nevada. Bulletin 83, MacKay School of Mines, University of Nevada, Reno and Nevada Bureau of Mines and Geology.
- Willey, G.R. and P. Phillips
1955 Method and Theory in American Archaeology. II. Historical-Development Interpretation. AA 57:723-819.

1958 Method and Theory in American Archaeology. University of Chicago Press, Chicago.
- Willey, G.R. and J.A. Sabloff
1974 A History of American Archaeology. W.H. Freeman and Company, San Francisco.
- Wiseman, L.
n.d. The Stillwater Management Area. Nevada Historical Society, Reno (manuscript).
- Wobst, H.M.
1978 The Archaeo-Ethnology of Hunter Gatherers of the Tyranny of the Ethnographic Record in Archaeology. Am Ant 43:303-309.
- Woodward, A.
1938 The "Honey" of the Early California Indians - A Strange Ethnological Error. SWM-M 12(5):175-180.
- Writers' Program of the Works Progress Administration in the State of Nevada
1940 Nevada: A Guide to the Silver State. Binford and Mort., Portland.
- Wyman, L.C. and N.C. Boyd
1937 Blood Group Determination of Prehistoric American Indians. AA 39:583-592.
- York, R.
1976 Cultural Resources Survey/Clearance Report for Proposed Desert Bums Salt Wells Motorcycle Race. Report CR3-109, Bureau of Land Management Carson City District Office.

York, R. and J. Pinzl

1975 Historical Site Report Hs-03-06, Sand Mountain Ruin #2, Bureau
of Land Management, Carson City District Office.

Zaugg, H.

n.d. Early Ranching in Churchill County. Nevada Historical Society,
Reno (manuscript).

APPENDIX A

Human Skeletal Remains From The Carson-Humboldt Sinks

BY

Larry S. Kobori

Introduction

Discussion of human skeletal remains recovered from archaeological sites in the Carson and Humboldt Sinks can be divided into three portions. The first part is concerned with early accounts and descriptions of isolated human bones and burials. The second portion focuses upon burial and osteological descriptions as a result of salvage operations and other excavations. The latter part reviews the few studies on Great Basin skeletal series aimed at testing hypotheses or elucidating the nature of prehistoric population interrelations. The value of these available reports is diminished by small sample size and poorly known provenience. As well, chronological determination for most of the burials has not yet been satisfactorily accomplished. Thus, conclusions based upon this limited data base are open to future revision.

Early Accounts

To facilitate understanding of the Carson and Humboldt Valley prehistoric population, it is necessary to review the osteological remains recovered from other areas of the Great Basin. Of particular interest are the Ophir and McDermitt skulls discovered in 1874 (?) and 1876. The plaster cast of the Ophir skull was re-discovered in the Musee de l'Homme, Paris by R.F. Heizer (Reichlen and Heizer 1966). Forgotten for 90 years, the specimen was originally described in 1876 by DeQuille. The calvarium was apparently uncovered during mining operations 300 to 400 feet below the surface in the Ophir Mine at Virginia City, Nevada. The calvarium is representative of a middle-aged male, with a low, retreating forehead, a bulging occipital, pronounced nuchal and temporal lines, and a complete interparietal bone (asterion to asterion-os inca). The cranial index of this specimen measures 75.13 (e.g. mesocranic) which is well within the range of prehistoric Central Californians and Kennedy's (1959) Great Basin sample. The length-breadth cranial index is utilized to describe general skull shape (e.g. long or round headed); 75.13 being intermediate between dolichocranic (longheaded) and brachyranic (round headed).

Virchow's (1892) McDermitt skull was originally collected near Fort McDermitt in 1876 by Dr. Geo. M. Kober and is referred to as specimen number 8, an elderly male 'Pah-Ute'. The specimen has wide, flaring malars; low, retreating forehead; pronounced nuchal and temporal lines; prominent glabella and supraorbital ridges; bony crest development along the sagittal suture; prognathic alveolus; single infraorbital foramen; exsutural mastoid foramen; os inca absent; os bregma absent; supraorbital foramen; os japonicum absent; frontal ossicles absent; parietal foramen present; os epipterium absent; temporal-frontal articulation absent; squamoparietal absent; and parietal process of temporal absent.

The Ophir and McDermit remains are typologically comparable to later finds in the Carson and Humboldt Sinks. The pronounced muscle markings, low retreating vault, and bulging occipital appear to be indicative of the prehistoric population. This morphological pattern can be seen in Hrdlička's (1907) description of United States National Museum specimen 243817, a Paiute from Nevada. No additional information on the skull's provenience was provided. Hrdlička (1927) provided additional craniometric data on six 'Shoshonean, Nevada' crania but again no exact provenience was provided.

Archaeology and Human Burials

The first comparative analysis of Great Basin crania to California cranial series was accomplished by Gifford (1926). This landmark study listed cranial measurements by their mean and standard deviation and defined various 'type patterns' characteristic for particular regions. The 24 crania comprising the Great Basin series came from Humboldt Valley sites (11), Lovelock Cave (8), and Nixon, Nevada (5). Gifford accepted Virchow's (1892) skull as characteristic of the Great Basin type. Resemblance to Gifford's sample included living Northern Paiute and Boas' (1899) Shoshonean sample.

Loud and Harrington (1929) briefly compared the cranial indices for seven skulls from Lovelock Cave with ten skulls from various Humboldt Valley sites. The cranial indices were computed to be 76.9 and 75.4 respectively, confirming earlier data suggesting prehistoric western Great Basin populations were mesocranic. Loud and Harrington (1929) also described the inhumation customs of the Lovelock Culture. The internments were often flexed to semi-flexed and covered with basketry (or placed in basketry) and/or were wrapped in tule mat bundles. Additional human burials recovered from the Carson Sink area (Spirit and Fish Caves) exhibited the same burial custom (cf. Wheeler and Wheeler 1969). At Spirit Cave, however, the Wheelers discovered two cremations. The charred bone fragments were placed in twine bags of split tule. Whether these distinctive burial traditions co-existed within the same culture or suggest two different cultures is not yet known.

Another human burial was excavated from Leonard Rockshelter (Heizer 1951). Assigned to the Leonard Culture, the infant's body was found beneath a burned basket deposit. Chunks of tufa were placed on top of the burned basketry. The infant's remains were found oriented in the fetal position. Unlike most burials in the Great Basin, the Leonard Rockshelter burial is dated via directly associated burned basketry. Radiocarbon age determinations were reported by Arnold and Libby (1950) and Heizer (1951) to be 5779 ± 400 years B.P. and 5694 ± 325 years B.P.

Burials discussed so far were recovered from caves and rockshelters that rim the Carson and Humboldt Sinks. This must not be interpreted to mean prehistoric individuals were buried only in those contexts. Excavations carried out by the University of California, Berkeley in the 1950's and

1960's exposed a number of burials from NV-Ch-15, the Humboldt Lakebed Site. The internments were exposed by wind deflation which outlined the circumference of the burials pits. The individuals were tightly flexed and placed on one side. The round to oval pits measured 20 x 30 to 38 inches in diameter. The depth of the burials was variable, however, 1½ to 2 feet was not uncommon. The original depth of the pit was probably deeper but wind deflation has stripped away the overlying topsoil. A cremation was also discovered at Ch-15 in a similar round pit in 1935 by R.F. Heizer. The cremation pit was radiocarbon dated to 2690 $\pm$ 250 years B.P. based on charcoal from the layer of burned material found directly below the cremated bones (Heizer and Napton 1970; Heizer n.d.; and cf. Table I).

Additional pit burials, very similar to Ch-15, were uncovered in 1932 at nearby site Ch- or Pe- (?) 13 (probably Loud # 13). Here the burials ranged from 'loosely' flexed to very tightly flexed. All five burials were found resting on their left side. Due to the degree of flexion, the burial pit shapes varied from round to oval. At both Ch-15 and site 13 it appears that the pits were either dug out explicitly for the purpose of internment or were re-utilized cache pits (Heizer n.d.).

Throughout most of the 1960's and 1970's, physical anthropological research of prehistoric Great Basin populations was limited to a series of short papers generally dealing either with isolated skulls or burials. This lack of substantive research can probably be attributed to fewer excavated burials and the rather comprehensive study published by Kennedy (1959). Kennedy's monograph examined intra- and inter- population skeletal variation utilizing Great Basin, California and Utah craniometric data. Univariante statistical comparisons revealed a "basic homogeneity" however slight regional variations were noted (Kennedy 1959:19). In western and southern Nevada (Kennedy's Central Area), the population was described as mesocranic to dolichocranic (mid to long headed) and metriocranial to acrocranial (mid to high, narrow skull). These findings are consistent with previously discussed papers.

A naturally mummified body from Chimney Cave near Lake Winnemucca, was subjected to radiocarbon dating utilizing portions of bone, preserved skin and associated cedar bark matting. The computed dates were 2500 $\pm$ 80 B.P., 2510 $\pm$ 80 B.P. and 2590 $\pm$ 80 B.P., respectively (Orr and Berger 1965). The mesocranic individual was interred on its side in a tightly flexed position much like Carson and Humboldt Sink burials. Associated with the burial were strips of rabbitskin and a bag made from a mountain sheep skin. The Chimney Cave body was wrapped in a mountain sheep skin and then covered with a mat of cedar bark. Four other individuals were recovered but it is not known if these also exhibited a similar burial pattern.

Reed (1967) described a recently uncovered burial from Ch-15. The skull was covered by a sand dune near the northwest edge of the site. The specimen is a large, robust adult male, very similar to the Ophir Mine skull. Both skulls possess true interparietal bones (os inca). Additional comparisons to other Great Basin specimens were not provided, however Reed did note that his Ch-15 skull does resemble California Early Horizon crania and the San Joaquin Tranquility site crania.

To circumvent the paucity of human skeletal remains in the Great Basin, Turner (1967) examined tule quids from Lovelock Cave to study dental morphology. Quids are the fibrous remnants of plant matter which have been chewed over a period of time. 20% of the 345 quids collected during the University of California's 1965 Lovelock Cave excavations exhibited bite marks. Of these, only eight quids were sufficiently clear to acquire age and dental information. While not overly informative regarding dental morphology, the study did reveal that both children and adults chewed quids.

Recent descriptions of disturbed burials from the Stillwater National Wildlife Refuge and the Pyramid Lake Indian Reservation have been published by Hardesty (1969) and Tuohy and Stein (1969). The Stillwater burial was found in the shoreline deposits overlooking the dry lakebed. As with the Humboldt Sink burials, the Stillwater body was in a semi-flexed position and on its side. One of the more spectacular burials ever recorded from the Great Basin is the Pyramid Lake 'shaman' burial. The shaman status of the adult male is based on associated grave goods. Artifacts found in association with the shaman were a white chert Elko Eared projectile point, several fish effigies, pendants (bone and slate), and trade beads from California. Tuohy and Stein (1969) note that similar effigy figures are known from the Fallon area. A radiocarbon age determination on bone collagen from the burial yielded a date of 1820 ± 180 years B.P. The adult male specimen is long headed, possesses prominent muscle markings and a bulging occipital.

The University of California, Berkeley, 1969 Lovelock Cave excavation project encountered a secondary, multiple burial. That is, isolated bones from at least three adults and one child were re-buried after disturbance into a single pit. One large femur, possibly from a male, was radiocarbon dated to 3400 ± 80 years B.P. (Morbeck 1970). Heizer and Napton (1970) also obtained a radiocarbon date from muscle tissue secured from one of the mummies excavated by Loud and Harrington (1929) at 3370 ± 100 B.P.

Recent Research

Except for short notes describing various disturbed burials (cf. Dansie 1974; Leavitt 1974; Warren 1974), the literature is conspicuous for its absence of reports analyzing skeletal series, with notable exceptions by Brooks et al. (1977) and Kobori et al. (in press). The Brooks et al. study marks a major departure from the typological orientation of previous analyses. They examined non-metric cranial and post-cranial variants to compare two known hunting/gathering populations (Pyramid Lake and Humboldt Sink) and an agricultural group (Lost City Puebloan). Their objective was to determine if prehistoric cultural differentiation was reflected biologically. Though not statistically analyzed, the Brooks concluded that the three regional populations practiced little or no intermarriage. This is particularly surprising in light of the geographic proximity between Pyramid Lake and the Humboldt Sink.

More recently, Kobori et al. (in press) examined the dentitions from Great Basin hunter/gatherers (Carson and Humboldt Sink populations), the

Fremont culture and the Lost City Pueblo. These samples were compared to prehistoric Californians and a number of contemporary and prehistoric Southwestern samples. Kobori, et al. attempted to test the hypothesis that a particular dental variant (the Uto-Aztecan premolar) is limited only to speakers of the Uto-Aztecan linguistic stock. Previous research in Arizona indicated the trait is present only in Uto-Aztecan families (e.g. Hopic and Pimic) which antedate the spread of the language into the Great Basin ca. 1000 years ago. The Numic family of the Uto-Aztecan stock was examined utilizing the collections in the Lowie Museum of Anthropology (University of California, Berkeley) and of the University of Nevada, Las Vegas. The single Great Basin specimen possessing the trait is a Bannock Indian photographed by Hrdlička (1921). Whether the presence of the premolar variant in the Great Basin is due to population spread from the proposed Proto-Numic homeland (cf. Fowler 1972; Goss 1968; Lamb 1958; and Miller 1966) or from the northeast corner of Arizona (home of the Hopic family) is not yet clear. Kobori, et al.'s samples were inadequate to conclusively solve the problem.

The physical anthropology of the Carson and Humboldt Sinks is still poorly understood. A number of specimens have never been reported in the literature and are presently stored in various university and museum collections (see Table 2). Attempts to clarify the nature of past populations before and after the proposed Numic movement into the Great Basin, is the most important research problem facing future investigators. Skeletal remains from the Carson and Humboldt Sinks will form an integral part of that future analysis.

References Cited

- Arnold, J.R. and W.F. Libby
1950 Radiocarbon Dates. Institute of Nuclear Studies, University of Chicago.
- Boas, R.
1899 Anthropometry of Shoshonean Tribes. American Anthropologist n.s. 1:751-758.
- Brooks, S.T., M. Galliher and R.H. Brooks
1977 A Proposed Model For Paleodemography and Archaeology in the Great Basin. IN, D.D. Fowler (ed), Models and Great Basin Prehistory. Desert Research Institute Publications in Social Sciences 12:169-194, Reno.
- Dansie, A.
1974 An Eagle Watches Over Her. Nevada Archaeologist 2(2):10-13.
- Fowler, C.S.
1972 Some Ecological Clues to Proto-Numic Homelands. IN, D.D. Fowler (ed), Great Basin Cultural Ecology: A Symposium. Desert Research Institute Publications in the Social Sciences 8:105-121.

- Gifford, E.W.
1926 California Anthropometry. University of California Publications in American Archaeology and Ethnology 22(2): 217-390, Berkeley.
- Goss, J.A.
1968 Culture-Historical Inference from Utaztecan Linguistic Prehistory. Occasional Papers of the Idaho State University Museum 22:1-42.
- Hardesty, D.
1969 A Salvaged Burial From Fallon. Nevada Archaeological Survey Reporter 3(4):10.
- Heizer, R.F.
1951 Preliminary Report on the Leonard Rockshelter Site, Pershing County, Nevada. American Antiquity 17(2):89-98.

n.d. Disposal of the Dead in the Western Great Basin. Ms. on file with Basin Research Associates, Oakland, California.
- Heizer, R.F. and L.K. Napton
1970 Archaeological Investigations in Lovelock Cave, Nevada. Contributions of the University of California Archaeological Research Facility 10:1-86, Berkeley.
- Hrdlička, A.
1907 Skeletal Remains Suggesting or Attributed to Early Man in North America. Bureau of American Ethnology Bulletin 33, G.P.O., Washington, D.C.

1921 Further Studies of Tooth Morphology. American Journal of Physical Anthropology 4:141-176.

1927 Catalogue of Human Crania in the United States National Museum Collections. Proceedings of the United States National Museum 69(5):1-127. G.P.O., Washington, D.C.
- Kennedy, K.A.R.
1959 The Aboriginal Population of the Great Basin. University of California Archaeological Survey Report 45:1-84, Berkeley.
- Kobori, L.S., R.J. Miller, S.T. Brooks, M. Galliher, C. Stevens and D.H. Morris
in press Great Basin Occurrence of a Southwestern Dental Trait: Uto-Aztecan Premolar. Paper presented at the 50th Annual Meeting of the Southwestern Anthropological Association, Santa Barbara, California. (in press) Nevada Historical Society.

- Lamb, S.
1958 Linguistic Prehistory in the Great Basin. *International Journal of American Linguistics* 24:95-100.
- Leavitt, C.P.
1974 The Physical Anthropology of an Aboriginal Burial from Goodsprings, Nevada. *Nevada Archaeologist* 2(2):19-22.
- Loud, L.L. and M.R. Harrington
1929 Lovelock Cave. *University of California Publications in American Archaeology and Ethnology* 25(1):1-184.
- Miller, W.R.
1966 *Anthropological Linguistics in the Great Basin*. IN, W. d'Azevedo, et al. (eds), *The Current Status of Anthropological Research in the Great Basin: 1964*. Desert Research Institute Social Sciences and Humanities Publications 1:75-112.
- Morbeck, M.E.
1970 Description of Skeletal Materials Found in Lovelock Cave (NV-Ch-18) in 1969. *Contributions of the University of California, Archaeological Research Facility* 10:191-197, Berkeley.
- Orr, P.C. and R. Berger
1965 Radiocarbon Age of a Nevada Mummy. *Science* 148:1466-1467.
- Reed, E.K.
1967 An Unusual Human Skull From Near Lovelock, Nevada. *Anthropological Papers of the University of Utah* 89:63-69.
- Reichlen, P. and R.F. Heizer
1966 The Ophir Skull from Virginia City, Nevada. *University of California Archaeological Survey Report* 66:85-99.
- Tuohy, D.R. and M.C. Stein
1969 A Late Lovelock Shaman and His Grave Goods. *Nevada State Museum Anthropological Papers* 14:96-130.
- Virchow, R.
1892 *Crania Ethnica Americana*. Schadel eines Pah Ute, Nordamerika. Verlag Von A. Asher and Co., Berlin.
- Warren, C.N.
1974 A Prehistoric Burial from Goodsprings, Nevada. *Nevada Archaeologist* 2(2):14-18.
- Wheeler, S.M. and G.N. Wheeler
1969 Cave Burials Near Fallon, Churchill County, Nevada. *Nevada State Museum Anthropological Papers* 14:70-78.

TABLE I

<u>Archaeological Site</u>	<u>Date and Reference</u>
NV-Ch-15	2690 $\pm$ 250 B.P. (Heizer and Napton 1970)
Chimney Cave	2500 $\pm$ 80 B.P. 2510 $\pm$ 80 B.P. 2590 $\pm$ 80 B.P. (Orr and Berger 1965)
Leonard Rockshelter	5779 $\pm$ 400 B.P. 5694 $\pm$ 325 B.P. (Arnold and Libby 1950; Heizer 1951)
Lovelock Cave	3400 $\pm$ 80 B.P. 3370 $\pm$ 100 B.P. (Heizer and Napton 1970; Morbeck 1970)
Shaman Burial	1820 $\pm$ 180 B.P. (Tuohy and Stein 1969)

Table 1. Radiocarbon Dates for Burials Discussed in Appendix A.

TABLE 2

<u>Archaeological Site</u>	<u>Date of Site-Form</u>
26-Ch-1c rockshelter	1940's (?)
26-Ch-11 crevice	1940's (?) & 1955
26-Ch-20 cave	1940
26-Ch-77 surface	1950's (?)
26-Ch-101 sand dune	1951
26-Ch-113 sand dune	1953
26-Ch-180 alkali flat	1973

Table 2. Additional Archaeological Sites Containing Human Skeletal Remains, Not Discussed in Appendix A. (compiled from site records on file at the Nevada State Museum)

APPENDIX B

Collectors' Interviews

BY

Colin I. Busby and Larry S. Kobori

Informant information on cultural resources, especially archaeological remains, was actively sought by Basin Research Associates during its data research for the B-20 Air Warfare Range overview. Letters to the editor were sent to the two Fallon, Nevada newspapers, the Fallon Eagle-Standard and the Lahontan Valley News, in order to elicit information from any knowledgeable community members. Our letters drew one response from Mr. Ira Kent of Stillwater, a long time resident and collector in the Fallon area. Arrangements were made to meet with Mr. Kent and any other interested parties and Mr. Busby and Mr. Kobori of Basin Research Associates conducted an interview on November 18.

Mr. and Mrs. Kent have an extensive collection and were extremely knowledgeable about the Carson Sink area in terms of artifact collecting. Their collection, primarily from the Carson and Humboldt Sinks, covers the entire range of chronological periods from the Western Pluvial Lakes Tradition to the Late Prehistoric Complex (9000 B.C. to A.D. 1850). For the B-20 Range, Mr. and Mrs. Kent have collected prehistoric cultural materials from the vicinity of the southern and western (southern $\frac{1}{2}$) boundaries of the present range (Fig. 1). As well, artifactual materials (primarily isolated finds) have been found from the present bombing range boundary south to the main artifact concentrations in the Stillwater Wildlife area.

The information presented by the Kents was confirmed and elaborated on by three additional collectors that Mr. and Mrs. Kent had arranged for us to meet. Mr. George Luke of Stillwater, a gentleman of 80+ years, and a well known collector and extremely knowledgeable person on the Fallon area, indicated that he had made several collections around Lone Rock in the early 1930s prior to its use as a bombing range. As well he confirmed the Kent's information on cultural resources to the south of Lone Rock and indicated that the main concentration of material started 3-4 miles south and southwest of the rock. Mr. Luke also noted, based on 60 years of collecting in the area, that cultural materials occur all the way south from Lone Rock to the Stillwater area.

Two additional collectors, Mrs. Lawrence and Mrs. Weishanpts of Stillwater, essentially confirmed Kent's and Luke's information and Mrs. Lawrence turned over a small collection (several Rose Spring Corner Notched projectile points) that she had made at the collecting locality on the southwest boundary of the present range to Basin Research Associates. All collectors noted that the locality had ground stone and chipping waste present as well as artifacts. This would apparently indicate a sizable temporary or "permanent" occupation of some significance.

An interesting feature concerning collecting in the Carson Sink was also

mentioned by the various collectors in regards to artifact hunting. It seems that when the ground surface (playa) absorbs moisture (even a small quantity), it swells several inches and thoroughly hides any surface manifestations of cultural remains. When it dries out, it shrinks and a strong windstorm deflates the surface material to expose the artifacts. Known collecting areas have been visited by all collectors who have indicated that they have found nothing on one visit but the next yielded excellent collecting opportunities. A majority of the artifacts viewed by Basin Research Associates from the Carson Sink were 'sand blasted' to one degree or another.

Based on the information elicited from the local collectors, it is readily apparent that archaeological remains were once present at Lone Rock and are currently present on the present southern and western boundaries of the B-20 Range. This information should be verified by a professional archaeological team through a reconnaissance survey prior to any additional actions by the U.S. Navy. Our informants have kindly offered to act as guides if this survey is requested.

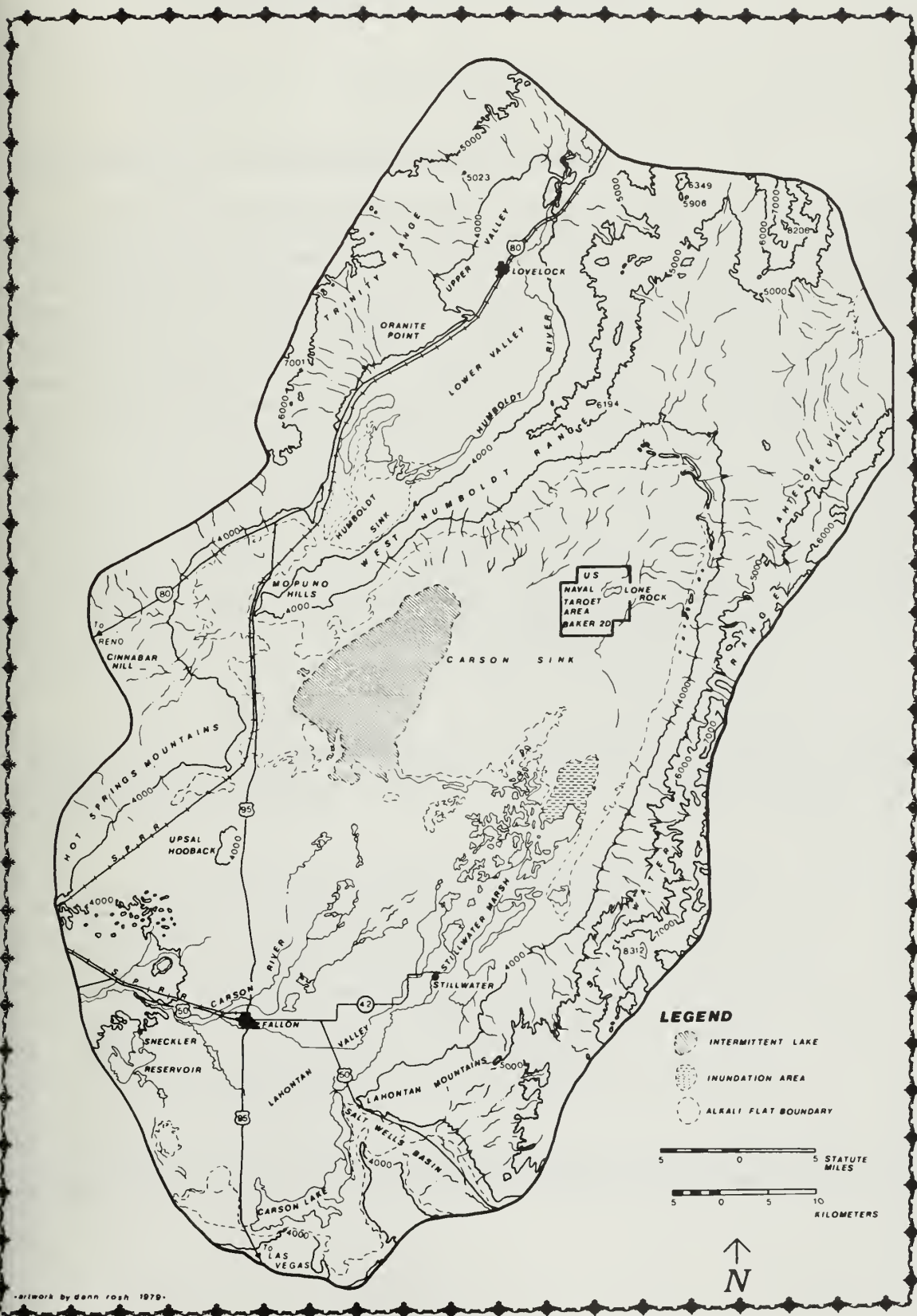


Figure 1



APPENDIX C

Rock Art in the Humboldt and Carson Sinks

BY

Karen M. Nissen

Early Records of Rock Art in Northwestern Nevada

In the early rush of emigration through this area to the gold fields of California, most travellers were little concerned with the surrounding country other than watering places and areas where animals could obtain feed. During this initial mass population movement, the area east of the Sierra Nevada began to be settled, especially near the base of those mountains, mainly by people who set up trading posts to supply the emigrants after their long desert journey (cf. Historic Overview, this report). Little exploration was made of the regions to the east during this period, but with the discovery of the Comstock Lode and the subsequent immigration of miners to the region from the played out mines of California, the whole area was examined for traces of ores. It was in this period that some of the first mentions of rock art, often called hieroglyphics in the early reports, began to be made. One of these early notes was made in the report of Captain J.H. Simpson in 1859 while exploring for a wagon route from Utah to Carson Valley. On June 6, while travelling from Carson Lake to the Walker River, he noted the following: "In the pass, just before attaining summit of divide, noticed some hieroglyphics on detached boulders" (Simpson 1876:87). No further description was made of the "hieroglyphics." Recent research located a petroglyph site, NV-Ly-7, in the pass between the Desert and Terrill Mountains neary Highway 95 which is considered to be the site noted by Simpson (Heizer and Baumhoff 1962:48).

Another early mention of rock art in the area was reprinted by Alexander Taylor in his series The Indianology of California which appeared in The California Farmer between 1860 and 1863. The original account was published in the Marysville Democrat in April, 1861, and it concerns petroglyphs in the Truckee Valley.

At a little distance below the bridge, on the left bank of the river, my companion turned off the road for the purpose of showing me an immense porphyry rock, of an oblong-square form, which we were unable to decipher. The figures are rudely carved in the rock, and were evidently executed some years ago... They, no doubt, belong to a race who inhabited this country prior to the present race of aborigines. Upon the top of this immense rock I noticed one cluster of figures in a circle, having in its center a crude representation of the Sun, surrounded by about a dozen other figures ... (Taylor 1861).

Myron Angel, in the work History of Nevada, recorded the following note on petroglyphs in the area now inundated by the Lahontan Reservoir.

There is a place on the Carson River where that stream cuts off the point of a foothil around which it sweeps at the lower terminus of what is known as the Big Bend, possibly one mile up the river from where once stood the Williams, or Honey Lake Smith's, Station. The place where the hill is cut by the stream gives a facing to the west that overlooks the desert and the country to the south. Up along the face of that cut, there are many figures, or characters, chiseled into the hard rocks, that can be seen by the hundreds. Spiral forms, rings, and snakes are the predominating characters. The Indians of the vicinity have no knowledge of them, not even a legend (Angel 1881:19-20).

This is one of the first historical mentions yet known on the petroglyphs near the study area. Recently, Gianelli (1960) was able to relocate the site of Williams Station during a period of low water when the reservoir became nearly dry. A photograph of petroglyphs located about one mile south of that site is included in the report. What is curious in this regard is that William Wright, alias Dan DeQuille, presented no information on the numerous petroglyph sites in the area. DeQuille wrote a series of newspaper articles which appeared in serial form in the Golden Era in 1861 under the title "Washoe Rambles" (DeQuille 1963). While his sketches provide important information on the historic Northern Paiute groups in the area, no notes include records on the rock art. It is possible that articles by him dealing with this subject might exist in other journals, but at present we have no historic information on the concentration of rock art in the region.

The Development of Chronological, Stylistic and Functional Definitions

Scientific research on the subject of rock art really began with the work of Garrick Mallery of the Bureau of American Ethnology with his publication Pictographs of the North American Indians (1886) and his later massive work Picture-Writing of the American Indians (1893). Mallery originally believed that many of the drawings could be interpreted - that they were a form of picture writing similar to the hieroglyphics of Egypt and Mesoamerica. However, in his later publication he noted that this idea was in error.

It must be admitted that no hermeneutic key has been discovered applicable to American pictographs, whether ancient on stone or modern on bark, skins, linen or paper. Nor has any such key been found which unlocks the petroglyphs of any other people. Symbolism was of individual origin and was soon variously obscured by conventionalizing; therefore it requires separate study in every region ... The fanciful hypotheses which have been formed without corroboration, wholly from such works as remain, are now generally discarded (Mallery 1893:34-35).

In his early work Mallery noted the occurrence of petroglyphs in the Fallon area. He stated:

On the western slope of Lone Butte, in the Carson

Desert, Nevada, pictographs occur in considerable number. All of these appear to have been produced, on the faces of boulders and rocks, by pecking and scratching with some hard mineral material like quartz. No copies have been obtained as yet (Mallery 1886:24).

The Lone Butte referred to is apparently the modern Rattlesnake Hill, for I.C. Russell, in his monograph on the geology of Lake Lahontan, names a hill at that point Lone Butte (Russell 1885:Plate VII). No one has been able to relocate and record these petroglyphs, and Heizer and Baumhoff (1962:25) state that they were apparently destroyed by dynamiting part of the hill.

Following Mallery's initial attempts at categorizing rock art. Julian Steward described and analyzed nearly 300 sites in the western United States in his work Petroglyphs of California and Adjoining States published in 1929. Most of the sites included in his study were recorded by untrained individuals who sent the information to the Department of Anthropology at the University of California, Berkeley. Steward categorized the designs into fifty types and plotted the distribution of these designs on maps which covered California, Nevada, Utah, Arizona and Baja California in an attempt to correlate the sites. Through this analysis Steward separated out four areas of rock art based upon the distribution of designs. Area A encompassed Nevada, Baja California and California east of the Sierra Nevada; curvilinear designs were considered to be characteristic of the region. Another region, was Area B, which included Arizona and Utah, and was characterized by greater numbers of "naturalistic and realistic" figures; Steward suggested that the rock art of this area was linked to Basketmaker and early Pueblo occupations. Relationships to Area A were noted by the presence of some similar geometric and naturalistic designs, e.g., mountain sheep, spirals and snakes, handprints, dots, connected circles, etc.. Steward also suggested that some of the designs diffused to the west, that is Area A, from this region. The other two regions separated out by the analysis were Area C, southwestern California, and Area D, Santa Barbara and Tulare regions.

Concerning the Great Basin he stated:

Area A has most in common with petroglyphs in other parts of the western hemisphere, especially in its abundance of curvilinear designs. These are probably among the oldest elements. The rectilinear figures are more specialized and distinctive of Area A and other special representations connect it with Area B (Steward 1929:228).

In concluding, Steward stated that the petroglyphs of areas A and B were closely connected and that rock art in both regions had considerable antiquity. While rock art in the southwest was considered to be connected with the Basketmaker and Pueblo cultures, similar cultural connections were not suggested for the Great Basin. Only the petroglyphs at Lost City in southern Nevada which showed definite links with the petroglyphs of Area B were assigned to early Pueblo occupation (Steward 1929:231). Rectilinear designs were considered to be more recent than curvilinear ones based upon superimposition of rectilinear designs over curvilinear ones and the more

restricted distribution of rectilinear elements.

Following Steward's research which suggested that design distributions could be used in deriving style areas, the study of petroglyphs was mainly left unstudied in the Nevada region while archaeological research was directed toward excavation of sites and development of chronologies. Steward (1937), in later writing on the rock art of the United States, suggested various explanations for petroglyphs and pictographs, including mere amusement, religious purposes, hunting luck, trail markers, etc.

Scientific research into rock art in Nevada resumed in 1958 when Baumhoff, Heizer and Elsasser studied the Lagomarsino petroglyph site (NV-St-1) near Virginia City, Nevada. This work was done under a contract with the Curtiss-Wright Corporation which was purchasing the land from the Bureau of Land Management. This represents one of the few instances in Nevada when the government has promoted the hiring of archaeologists to record rock art. Through careful recording of the individual designs noting their approximate locations within the site, they were able to confirm some of the suggestions made earlier by Steward and to suggest a chronological framework for the designs.

Petroglyphs at the Lagomarsino site occurred on a cliff face and an adjacent talus slope. Through statistical analysis of the distribution of the designs, which had been categorized into 29 types, Baumhoff, Heizer and Elsasser demonstrated that the distinction between curvilinear and rectilinear designs was valid. The analysis showed that the petroglyphs on the cliff face were predominately angular or rectilinear, while those on the talus slope were mainly curvilinear.

Suggestions as to the function of the petroglyphs were made by the researchers; they postulated that the designs may have been made by shamans or those seeking power due to the location of the site near springs (Baumhoff, Heizer and Elsasser 1958:4-5). Finally, they proposed a tentative time frame for the petroglyphs. They recognized a style not noted by Steward, which they termed the groove-and-pit, from NV-Ch-3 (Grimes Point). This style was stated to be considerably older than either the curvilinear or rectilinear styles due to the complete repatination of the surfaces. The final sequence proposed was: 1) groove-and-pit, beginning prior to the Altithermal before ca. 7000 B.P.; 2) curvilinear, beginning after the Altithermal, ca. 3000 to 4000 B.P.; and 3) rectilinear, commencing ca. 1000 B.P. This is the first attempt at chronological placement for petroglyph styles within the Great Basin.

The following year, after considerable research into other petroglyph locations in Nevada, Heizer and Baumhoff (1959) published a note in Science where they stated that the petroglyph sites were connected with hunting locations, especially for deer. They found that the sites were located at points where herds of deer migrating out of the Sierra Nevada in large groups could be ambushed at draws and other points. In the southern half of the state, game migrations were vertical and the petroglyphs were associated with permanent springs. Thus, they suggested an ecological model for petroglyph occurrences.

In 1962, Heizer and Baumhoff published their comprehensive work, Prehistoric Rock Art of Nevada and Eastern California. They had secured funding for research

into the rock art and recorded a number of previously unrecorded sites and added data contributed by many people during the thirty years since publication of Steward's initial work. These researchers followed the suggestion made earlier by Steward: "...thanks largely to the enthusiastic cooperation of many nonprofessional observers who have painstakingly sketched and photographed petroglyphs, material has continued to accumulate in scientific institutions. Little has been published, but when competent archaeologists can be enticed to set aside their spades long enough to ponder petroglyphs, we may expect a much better understanding of this interesting subject" (Steward 1937: 406).

One hundred rock art sites in Nevada were described in the work; seventy-four of these sites had photographs or drawings of the designs which could be analyzed. Fifty-eight design elements, derived in part from the listing provided by Steward, were used to classify the petroglyphs and pictographs. Five major groups of rock art were identified in the analysis: Great Basin Pecked, Great Basin Painted, Great Basin Scratched, Puebloan Painted and Pit and Groove. Great Basin Pecked and Great Basin Painted correlate with the style Area A designs noted earlier by Steward. The general Great Basin Pecked style was subdivided into two substyles, Great Basin Representational and Great Basin Abstract; the latter substyle was further divided into Curvilinear and Rectilinear based upon earlier research by Steward (1929) and Baumhoff, Heizer and Elsasser (1958). The styles were determined by both the method of decoration, e.g., pecked, scratched, painted, and the types of designs present (see Heizer and Baumhoff 1962:197-202).

Through analysis of the distribution of the designs, they found that the Great Basin Curvilinear style occurred in almost all regions where petroglyphs were present, the Rectilinear style was generally limited to the western and southern regions, and the Representational style centered mainly in the southern part of the state. The Scratched style had a very limited distribution, occurring in the western part of Nevada. The Puebloan Painted style was centered in southeastern Nevada, and the Great Basin Painted style occurred across the central part of the state. The Pit and Groove style centered about the west central part of Nevada, with one occurrence to the northeast in Eureka County.

Further support for the hunting magic function of the petroglyphs was documented in this study. A majority of the petroglyph sites were found to be located either in draws where game could be ambushed, along game migration trails, or in association with hunting blinds, fences, or areas where corrals could have been constructed. One site, the Whisky Spring site, had the remains of a juniper post fence present. Differences were noted in the environmental factors connected with petroglyph sites in the northern and southern areas of the state, and Heizer and Baumhoff suggested that deer were the main quarry in the north while in the south mountain sheep were hunted. The authors thus discounted the idea that the petroglyphs were "aimless doodlings" and connected them with ecological variables. Both styles of painted designs were found to fall outside of this explanation; most of these were found in caves which would not correlate with hunting. The distribution of the Pit-and-Groove style also suggested a different function for those designs. As for ethnographic identification, this was found to be lacking for petroglyphs; in most areas the designs were attributed to coyote, the devil, pre-Paiute Indians, waterbaby, and other mythological creatures. For the Fallon area, the Northern Paiutes

interviewed denied that petroglyphs were even present in their territory (Stewart 1941:418).

To develop a chronological framework for the rock art, Heizer and Baumhoff used a variety of methods, including superimposition, patination differences, association of petroglyphs with archaeological deposits, historical representations in the designs, and others. It had previously been determined that the rectilinear elements were more recent than curvilinear ones due to instances of superimposition of rectilinear over curvilinear and the more restricted distribution of the rectilinear. In addition, the Pit-and-Groove style had been suggested to be earlier than any of the other styles due to the complete repatination of those designs at the NV-Ch-3 site. At Leonard Rockshelter (NV-Pe-14), which is included in the study area, curvilinear and rectilinear designs were found on the cliff walls. Heizer and Baumhoff argue that these designs correlate with the Lovelock Culture (or variants) occupation at that site because they occur at a level on the wall which could only have been reached without the use of ladders and ropes from deposits of that period. They then argue that since there is considerably more patination on the pit and groove designs than the abstract ones that a time gap must occur between those two styles, which they suggest is evidenced in lack of occupational material at both Hidden Cave and Leonard Rockshelter between ca. 3000 B.C. and 1000 B.C. The Pit-and-Groove style was then correlated with the Leonard Culture or variants, dated ca. 5000-3000 B.C., roughly equivalent to the Altithermal (Heizer and Baumhoff 1962:234-235). There is some confusion on this dating, however, for they earlier suggest that the style may correlate with the Anathermal (Heizer and Baumhoff 1962:222-223). Due to some superimposition of scratched over pecked designs, they believe that the scratched style is late in time, and the same was suggested for the Great Basin Painted style. Somewhat confused evidence is used to suggest that the Great Basin Painted style is fairly recent. They note that the style may have been eroded away in open locations, yet they suggested that the more restricted occurrence of the style and the fact that it would tend to be eroded at open sites argue for the relative recency of the style (cf. Heizer and Baumhoff 1962:207;234). The Puebloan Painted style, defined on the basis of southwestern designs, is correlated with the Pueblويد colonization of southern Nevada, ca. 200 B.C. to A.D. 1100. The suggested dates for the styles established by Heizer and Baumhoff (1962:Table 9) are as follows:

Pit and Groove	5000 B.C. to 3000 B.C.
Great Basin Curvilinear	1000 B.C. to A.D. 1500
Great Basin Rectilinear	B.C./A.D. to A.D. 1500
Great Basin Representational	B.C./A.D. to A.D. 1500
Great Basin Scratched	A.D. 1000 to A.D. 1500
Great Basin Painted	A.D. 1000 to A.D. 1500
Puebloan Painted	ca. 200 B.C. to A.D. 1100

These dates were obviously only guesses at chronology based upon available evidence. Recently, two new styles of petroglyphs have been added to the seven styles defined by Heizer and Baumhoff; these are the Stillwater Faceted style and the Pahrnagat style. The Stillwater Faceted style has been described by Nissen (1975) and Heizer and Nissen (1978). This style consists of areas where the rock has been ground or rubbed along the sides of boulders, areas

where two faces intersect, etc. It was first recorded and described from the type site NV-Ch-602, in the study area, but it may have been noted earlier in Heizer and Baumhoff's description of the Grimes Point site, NV-Ch-3 (Heizer and Baumhoff 1962:20, Plate 3c). The rubbed facets are completely repatinated and have no defined design form in the sense that one can describe pit and groove, circles, rectangles, etc. It is suggested that the Stillwater Faceted style represents the earliest yet known form of rock art in the Great Basin and correlates with higher lake levels, ca. 9000-7500 B.C. coincident with the Anathermal and the Western Pluvial Lakes Tradition. The other new style, the Pahrnagat style, was recorded by Heizer and Hester (1974) from Lincoln County, southern Nevada and is primarily defined on the basis of what have been determined to be costumed men often carrying atlatsls. We know through archaeological evidence (Hester 1973:34) that the bow began to be used ca. A.D. 500 with the introduction of the Rose Spring and Eastgate series projectile points, so the figures would date prior to that point in time. Heizer and Hester suggest that the Pahrnagat style correlates with Basketmaker colonization in southern Nevada and dates to ca. 300 B.C. to A.D. 400. Heizer and Nissen (1978) have recently reviewed the rock art of Nevada and California and have incorporated these new styles into a revised chronology for the area.

Since publication of Heizer and Baumhoff's work, a number of rock art sites have been recorded for Nevada (Cowan 1967; Moen 1969; Tuohy 1963, 1969, 1973; Rusco 1970; Jerems 1971, among others). None of these has suggested that the hunting magic theory proposed by Heizer and Baumhoff is incorrect. Thomas and Thomas (1972) described pictographs from Toquima Cave (La-1) and Gatecliff Cave (Ny-301), some of which they suggested were representations of projectile points. The types said to be present were Eastgate Expanding Stem, Elko Eared (or Pinto Barbed), and a lanceolate form similar to Lind Coulee. Based upon these tenuous examples of representations of projectile points, they suggested that the chronology for rock art should be revised with the Representational style appearing prior to the Abstract. Most researchers have not accepted this revised chronology due to the insecure identification of the designs claimed to be representations of projectile points. However, the suggestion that the Great Basin Painted style should be analyzed on the basis of elements present and correlated with petroglyph designs is something which needs to be done. Although it seems likely that the designs correlate in some way with those of the petroglyphs in terms of cultural symbolism. Work by Trudy Thomas (1976) at the Hickison Summit and Northumberland petroglyph sites also provides support for the hunting magic hypothesis. Thomas states: "Petroglyphs at Northumberland and Hickison occur on only those boulders situated in perfect position to act as attack and/or drive stations in the consecutive attack hunt system; 'out of line' boulders were simply ignored by the artisans" (Thomas 1976:68).

Two other studies made since publication of Heizer and Baumhoff are important for assessments of chronology and the hunting magic theory. In 1965, Jay von Werlhof published a study on the rock art of Owens Valley, eastern California. He was able to obtain information on game migration routes within the valley, and this information showed that almost all of the petroglyph sites could be correlated with either migration routes or winter grazing areas of deer. Differential patination, superimposition, and distribution of designs present at the sites confirmed the relative chronology developed by Heizer and

Baumhoff. Von Werlhof suggests that the Pit-and-Groove style correlates with the Anathermal (von Werlhof 1965:120). He also postulates that the Rectilinear style evolved from the Curvilinear style as the population within the valley grew and became more sedentary. He notes: "Statistics show that this change was purely stylistic; however, it is assumed that the meanings of the glyphs--whatever they might have been--remained the same. For example, the circle became a cross, and the grid oval became the grid rectilinear" (von Werlhof 1965:3). The Representational style was generally found in winter grazing areas, mainly in the northern part of the valley, and was a fairly recent development. This is based on the superimposition of these designs over abstract ones as well as the limited distribution of the representational designs. The most recent types of rock art in the valley are the scratched and painted designs which overlie other designs. Von Werlhof's data are important for affirming the chronological sequence and hunting magic hypotheses.

The other study of importance is that of Grant, Baird and Pringle in the Coso Range of eastern California (1968). This area can be classified as unique among the regions yet studied in the Great Basin due to the preponderance of representational designs. One factor which greatly aided in the seriation of designs was the technology represented which showed hunters armed with both the bow and arrow and atlatl and dart. Using Grosscup's (1960:33-34) suggestion that the bow appeared at Lovelock Cave ca. 500 B.C.-A.D. 1, Grant et al. propose that it would have reached the Coso Range ca. 200 B.C.-A.D. 300 (Grant et al. 1968:51,57). Utilizing this evidence, along with the representational designs of sheep, anthropomorphs with weapons, etc., they have been able to develop a neat seriation for the majority of the designs present at the sites. The area is extremely unusual in that more than half of the total designs, over 7800, are mountain sheep.

The earliest designs are the pit and groove, which are relatively scarce (only 21 out of 14,084 total designs) and occur at only three sites. Grant et al. suggest a beginning date of ca. 1000 B.C. or earlier and an end date of A.D. 1000 for the rock art; they postulate that the sheep bands may have been decimated by the introduction of the bow and arrow which greatly increased the hunting efficiency and led to the movement of the remaining sheep out of the region and this was followed by human emigration. Following this a brief resurgence of rock art was seen in the pictographs or rock paintings which are suggested to have been fashioned from A.D. 1700-1900. Essentially, this chronology fits with that proposed by Heizer and Baumhoff, although it pushes the Representational style back approximately 1000 years and does not suggest a separate early time period for the abstract designs. In addition, the designs in the Coso Range clearly suggest that the petroglyphs are linked to hunting magic in the form of a sheep cult in the area; in this case it has been proposed that the hunting magic became so effective that it eventually led to the extermination of most of the prey.

Thus, the hypothesis presented by Heizer and Baumhoff seventeen years ago has been reconfirmed by a number of observations. Clear depictions of the hunt are represented in the Coso Range (Grant et al. 1968) and at the East Walker River site (Ly-1) (Nissen 1974). In addition, confirmation of the relative dating of the petroglyph styles has been made by analyses of desert

varnish by Bard (1979). He sampled boulders from the Grimes Point (Ch-3) and East Walker River (Ly-1) petroglyph sites and applied neutron activation and X-ray fluorescence analyses to determine the relative abundance of thirty elements comparing the varnish on the petroglyphs to the heart rock and unpecked control surfaces. The results of neutron activation analyses, which were made on pit and groove, curvilinear, rectilinear and representational designs at the Grimes Point site, show a general increase in the elements in the pecked areas as compared with the heart rock while unpecked control surfaces exhibited even greater abundances of the same elements. X-ray fluorescence analyses of boulders from both sites essentially confirmed the results obtained from neutron activation tests. Many variables have been shown to affect the formation of desert varnish, and while Bard's results do not provide exact chronologies for petroglyph designs, they do confirm the relative chronology developed by Heizer and Baumhoff.

In sum, petroglyph research in the Great Basin proceeded from Steward's vague categorization of the region as falling within one style area (A), characterized by an abundance of curvilinear and rectilinear designs as well as some naturalistic ones, to the more comprehensive analysis of Heizer and Baumhoff which suggested stylistic divisions within the area. The work of Heizer and Baumhoff also suggested that the majority of the rock art sites, especially petroglyph locations, were related to hunting magic; this idea derived from research which showed correlations between petroglyph locations and game migration routes, hunting blinds, fences, etc. Since the publication of Prehistoric Rock Art of Nevada and Eastern California, the ideas proposed by Heizer and Baumhoff concerning function and chronology of rock art in that region have not been changed to any considerable degree, although new data have been added (cf. Heizer and Nissen 1978). Recently, rock art research has received considerable attention and study, but the petroglyphs in the Great Basin have not been selected out for study by archaeologists to attempt to redefine the chronologies and stylistic areas in light of recent developments in other areas of archaeology and linguistic prehistory in the region (cf. Hester 1973). Further analyses of rock art should be directed toward the refinement of some of the Representational designs into subtypes to attempt to define relationships between areas as was skillfully done by Rusco (1973) for a number of anthropomorphic figures. Because researchers are generally certain when they are working with subtypes of one type of representational design, e.g., mountain sheep, human figures, etc., these types of designs offer some of the best hope for refinement of classification. However, abstract designs are generally the most commonly occurring elements in Great Basin rock art, and one problem here is to define the limits of design categories, i.e., are all tailed circles the same or are there actually two or more types represented by straight tailed circle, wavy tailed, split tailed, etc. The research into interpretation has only begun and much refinement in chronology and relationships between regions will likely be realized with more intensive research by archaeologists.

Rock Art Sites in the Study Area

Within the study area sixteen rock art sites have been recorded. More than half of these sites are located within the Lahontan Mountains at the

southwestern edge of the Stillwater Range where the majority of other archaeological research has been carried out. This one area of Nevada seems, based on present evidence, to contain one of the largest petroglyph concentrations in the state. From the Grimes Point site (Ch-3) along the northern and western edge of the low mountain area, nine separate rock art sites have been recorded. These sites include both pictograph sites in caves and petroglyph sites. In addition, three of the most important sites in the Great Basin for chronological ordering of petroglyphs are located in the study area.

As previously noted, the Leonard Rockshelter site (Pe-14) has been important for suggesting relative dates for the Curvilinear and Rectilinear abstract styles through postulated correlation with the Lovelock Culture materials present. To the south, the extensive Grimes Point (Ch-3) site, which is both a state and national monument, has been extremely significant for chronological ordering due to the occurrence of large numbers of pit-and-groove, curvilinear and rectilinear elements (Baumhoff, Heizer and Elsasser 1958; Heizer and Baumhoff 1962; Bard 1979). Recent research by Nissen (1971) also suggested that this may be one of the largest rock art sites in the Great Basin, with over 900 individual boulders with petroglyphs present. More than 550 of these boulders with more than 3000 designs were recorded and will be described in Nissen's dissertation (in preparation). To the northeast, just north of Fish Cave, is the type site for the Stillwater Faceted Style, Ch-602 (Nissen 1975; Heizer and Nissen 1978). Over 105 boulders with facets, some with nearly the entire rock surface modified, have been located at the site. Present research suggests that the complete repatination of the faceted surfaces and the really formless shape of the "designs" infer considerable antiquity for the style. It is presently believed that the style represents the oldest form of rock art in the Great Basin from which the Pit-and-Groove and other styles developed. Research indicates that the site may be correlated with former high lake levels, either Sehuo 3 or Fallon 1, when lake waters would have forced migrating game nearer to the site. It is only conjecture, however, that this style of rock art is connected with hunting magic. Research by Bard on the desert varnish indicates that the faceted surfaces are completely repatinated (Bard, personal communication 1979). At present, it is proposed that the style correlates with the Anathermal period and the Western Pluvial Lakes Tradition. The style might also be present just to the south of the main Grimes Point locality where Heizer and Baumhoff (1962:20) reported rubbed surfaces.

Three other large petroglyph sites, Ch-603 (Picnic Cave), Ch-71, and Ch-20 (Fish Cave) have also been intensively recorded by Nissen. Through mapping and gridding the site areas, it has been found that these sites are much larger than had been previously suggested, with nearly 500 boulders at the three sites and over 1300 designs. These sites differ from the Grimes site in that they lack the Pit-and-Groove designs and contain larger percentages of representational designs, suggesting continuation of petroglyph making in the region for a considerable period of time. Mayer (1975) suggests that some of the designs at Ch-71 and other sites record astronomical observations.

Petroglyphs have also been recorded near the entrance to Hidden Cave and at Lone Butte or Rattlesnake Hill (Mallery 1886:24; Steward 1929:144; Heizer and Baumhoff 1962:20-21,25). One isolated boulder with petroglyphs lies just

south of Reed Butte, and another petroglyph boulder has been recorded as being part of a cairn in the Simpson Pass region.

Pictographs are present in three cave sites in the study area, and at Dynamite Cave, pictographs were associated with a child's skeleton (Heizer and Baumhoff 1962:21). A pictograph site was also noted by Loud near a burial ground northeast of Humboldt Lake (Loud and Harrington 1929:134). Just outside of the study area to the south and west, additional petroglyph and pictograph sites are known. It is also likely that many other petroglyph sites are present within the study area. Local citizens have stated that many sites are known within the Stillwater Range which has not been intensively surveyed by archaeologists other than brief surveys of some of the lower areas by Roust and Grosscup (1957). The West Humboldt Range is generally unknown other than from the cave excavations. It is also possible that rock art may be present at Lone Rock in the center of the bombing range. Local residents have also stated that one other large petroglyph site is present in the Eetza Mountain area, although brief surveys of the eastern end of the mountain failed to locate the site.

In the main, archaeologists have tended to leave the study of rock art to amateurs, and it is partly for this reason that little research has been directed toward rock art survey in the region. Undoubtedly, many more petroglyph and pictograph sites are present in the study area, and these should be located and intensively recorded to permit other researchers to be able to use the data for comparative analyses. A major problem in rock art research is that the boulders cannot be curated, so researchers are dependent upon published research for complete records. In many cases the petroglyph and pictograph records are incomplete, lacking information on locations of designs, directions which designs face, and complete information and photographs of designs present within sites. At present, new methods are being devised to obtain complete records of petroglyph sites so that other researchers will not be required to return to the sites for information lacking in the reports and to allow them to relocate individual boulders in the field which need to be analyzed for other types of studies such as the patination analyses described by Bard and others (Bard, Asaro and Heizer 1976, 1978; Bard 1979). A major stumbling block in refinement of rock art analysis has been the lack of archaeologists willing to devote themselves to the study of those sites in an attempt to incorporate rock art data with other archaeological research. With the aim of archaeology currently directed toward understanding cultural processes and systems, the neglect of rock art research leaves a large void in the prehistoric record.

While rock art sites have been left unstudied other than by a few archaeologists, recent interest in the sites by the general public has led to the destruction of some of the locations. Because petroglyphs are considered to be examples of "primitive art", some sites have been vandalized by collectors intent on securing fragments of that art for their personal adoration and curation. Other sites have been greatly disturbed through mismanagement and neglect on the part of officials responsible for their preservation. The Grimes Point site in the study area is one example of this neglect. For years the site has been known to exist; Steward (1929:143) provided a description of the site in his early study of rock art. Despite this knowledge, however,

the site was abused for many years with the establishment of a dump in the central part of the site, the construction of roads through the site for access, the bulldozing of portions of the site in gravel quarrying operations, later painting of county ordinances over petroglyphs prohibiting the dumping of dead animals at the site, and recent spray painted graffiti and chiseling of rocks by vandals and collectors. When Heizer and Baumhoff's work was published indicating the importance of the site for rock art chronology, nothing was done to protect the site. Recently, the Bureau of Land Management has attempted to preserve the sites in the Grimes Point area by cleaning the area of trash, constructing a fence along the western and northern portion of Eetza Mountain, and developing an interpretive trail through the Grimes Point site (Hatoff 1977). While this effort is to be commended as an initial phase of preservation, future stages should include funding for studies to completely record the remainder of the Grimes site and to study the recent changes in the boulders with petroglyphs in the area to determine whether the sites are being damaged by collectors and environmental changes (cf. Nissen 1977). Because the sites are exposed and due to the infeasibility of curation of the boulders, the federal agencies empowered with their protection should actively seek researchers to determine what types of information should be obtained to completely record and preserve this unique aspect of our prehistoric heritage.

References Cited

- Angel, M. (ed)
1881 History of Nevada. Oakland, Thompson and West.
- Bard, J.C.
1979 The Development of a Patination Dating Technique for Great Basin Petroglyphs Utilizing Neutron Activation and X-ray Fluorescence Analyses. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Berkeley.
- Bard, J.C., F. Asaro and R.F. Heizer
1976 Perspectives on Dating of Great Basin Petroglyphs by Neutron Activation Analysis of the Patinated Surfaces. Lawrence Berkeley Laboratory Report 4475.

1978 Perspectives on the Dating of Prehistoric Great Basin Petroglyphs by Neutron Activation Analysis. Archaeometry 20(1):85-88.
- Baumhoff, M.A., R.F. Heizer and A.B. Elsasser
1958 The Lagomarsino Petroglyph Group (Site 26-St-1) Near Virginia City, Nevada. University of California Archaeological Survey Report 43(2), Berkeley.
- Cowan, R.A.
1967 A New Rock Art Site from the Truckee Canyon, Washoe County, Nevada. Nevada Archaeological Survey Reporter 1:10-14, Reno.
- DeQuille, D.
1963 Washoe Rambles. Los Angeles, Westernlore Press.
- Gianelli, V.P.
1960 Site of Williams Station, Nevada. Nevada Historical Society Quarterly 3(4):5-12.
- Grant, C., J.W. Baird and J.K. Pringle
1968 Rock Drawings of the Coso Range, Inyo County, California. Maturango Museum Publication 4, China Lake, California.
- Hatoff, B.
1977 Cultural Resource Management at Grimes Point. Nevada Archaeological Survey Reporter 10(2):1-3, Reno.
- Heizer, R.F. and M.A. Baumhoff
1959 Great Basin Petroglyphs and Prehistoric Game Trails. Science 129(3353):904-905.

1962 Prehistoric Rock Art of Nevada and Eastern California. University of California Press, Berkeley.

- Heizer, R.F. and T.R. Hester
1974 Two Petroglyph Sites in Lincoln County, Nevada. University of California Archaeological Research Facility Contributions 20:1-52, Berkeley.
- Heizer, R.F. and K.M. Nissen
1978 Prehistoric Rock Art of Nevada and California. IPEK (Jahrbuch fur Prahistorische und Ethnographische Kunst) 24:148-157, New York and Berlin.
- Hester, T.R.
1973 Chronological Ordering of Great Basin Prehistory. University of California Archaeological Research Facility Contributions 17, Berkeley.
- Jerems, J.
1971 The Pistone Site: A Petroglyph Site in the Wassuk Mountains, Nevada. Nevada Archaeological Survey Reporter 5(1):3-7, Reno.
- Loud, L.L. and M.R. Harrington
1929 Lovelock Cave. University of California Publications in American Archaeology and Ethnology 25(1), Berkeley.
- Mallery, G.
1886 Pictographs of the North American Indian: A Preliminary Paper. Fourth Annual Report of the Bureau of American Ethnology. Washington, D.C.
- 1893 Picture-Writing of the American Indians. Tenth Annual Report of the Bureau of American Ethnology. Washington, D.C.
- Mayer, D.
1975 Star-Patterns in Great Basin Petroglyphs. IN, A.F. Aveni (ed.), Archaeoastronomy in Pre-Columbian America:109-131. University of Texas Press.
- Moen, M.
1969 Paiute Springs. Nevada Archaeological Survey Reporter 3(1):4-7, Reno.
- Nissen, K.M.
1971 A Survey of Petroglyphs in the Fallon Area. Nevada Archaeological Survey Reporter 5(5):4-5, Reno.
- 1974 The Record of a Hunting Practice at Petroglyph Site NV-Ly-1. University of California Archaeological Research Facility Contributions 20:53-81, Berkeley.
- 1975 A New Style of Rock Art in the Great Basin: The Stillwater Facetted Style. Nevada Archaeological Survey Reporter 8(2):10-11, Reno.

- Nissen, K.M.
1977 Grimes Point Revisited: Are Petroglyph Sites to be Art Museums and Remain Archaeological Mysteries? Nevada Archaeological Survey Reporter 10(3):12-14, Reno.
- n.d. Images from the Past: An Analysis of Six Western Great Basin Petroglyph Sites. Ph.D. Dissertation, Department of Anthropology, University of California, Berkeley (in preparation).
- Roust, N.L. and G.L. Grosscup
1957 Archaeology of Hidden Cave (NV-Ch-16), Nevada. Manuscript # 171, Archaeological Research Facility, University of California, Berkeley.
- Rusco, M.
1970 A Petroglyph Site in the Humboldt National Forest, White Pine County, Nevada. Nevada Archaeological Survey Reporter 4(6):3-8, Reno.
- 1973 Types of Anthropomorphic Figures in Great Basin Art. Nevada Archaeological Survey Reporter 7(2):4-17, Reno.
- Russell, I.C.
1885 Geological History of Lake Lahontan, a Quaternary Lake of Northwestern Nevada. United States Geological Survey Monograph 11. Washington, D.C.
- Simpson, J.C.
1876 Report of Explorations Across the Great Basin Territory of Utah for a Direct Wagon-Route from Camp Floyd to Genoa, in Carson Valley, in 1859. U.S. Army Engineer Department, Washington, D.C.
- Steward, J.H.
1929 Petroglyphs of California and Adjoining States. University of California Publications in American Archaeology and Ethnology 24(2), Berkeley.
- 1937 Petroglyphs of the United States. Smithsonian Institution Annual Report for 1936:405-425, Washington, D.C.
- Stewart, O.C.
1941 Culture Element Distributions: XIV, Northern Paiute. University of California Anthropological Records 4(3), Berkeley.
- Taylor, A.S.
1861 The Indianology of California, No. 46. The California Farmer, June 7, 1861.

- Thomas, D.H. and T.C. Thomas
1972 New Data on Rock Art Chronology in the Central Great Basin.
Tebiwa 15(1):64-71, Pocatello.
- Thomas, T.C.
1976 Petroglyph Distribution and the Hunting Magic Hypothesis in
the Central Great Basin. Tebiwa 18(2):65-74, Pocatello.
- Tuohy, D.R.
1963 Archaeological Survey in Southwestern Idaho and Northern Nevada.
Nevada State Museum Anthropological Paper 8, Carson City.
- 1969 A "Wounded Elephant" and Three Other Petroglyphs in Northern
Washoe County, Nevada. Nevada Archaeological Survey Reporter
3(1):9-12, Reno.
- 1973 A Newly Discovered Pit-and-Groove Petroglyph Site, Lyon County,
Nevada. Nevada Archaeological Survey Reporter 7(2):26-29, Reno.
- von Werlhof, J.C.
1965 Rock Art of Owens Valley, California. University of California
Archaeological Survey Report 65, Berkeley.

Bureau of Land Management
Library
Bldg. 50, Denver Federal Center
Denver, CO 80225

U.S. DEPARTMENT
BUREAU OF LA

BORROWI

E A Cultural Resource
78 Humboldt Sinks, Ne

.N4

B37

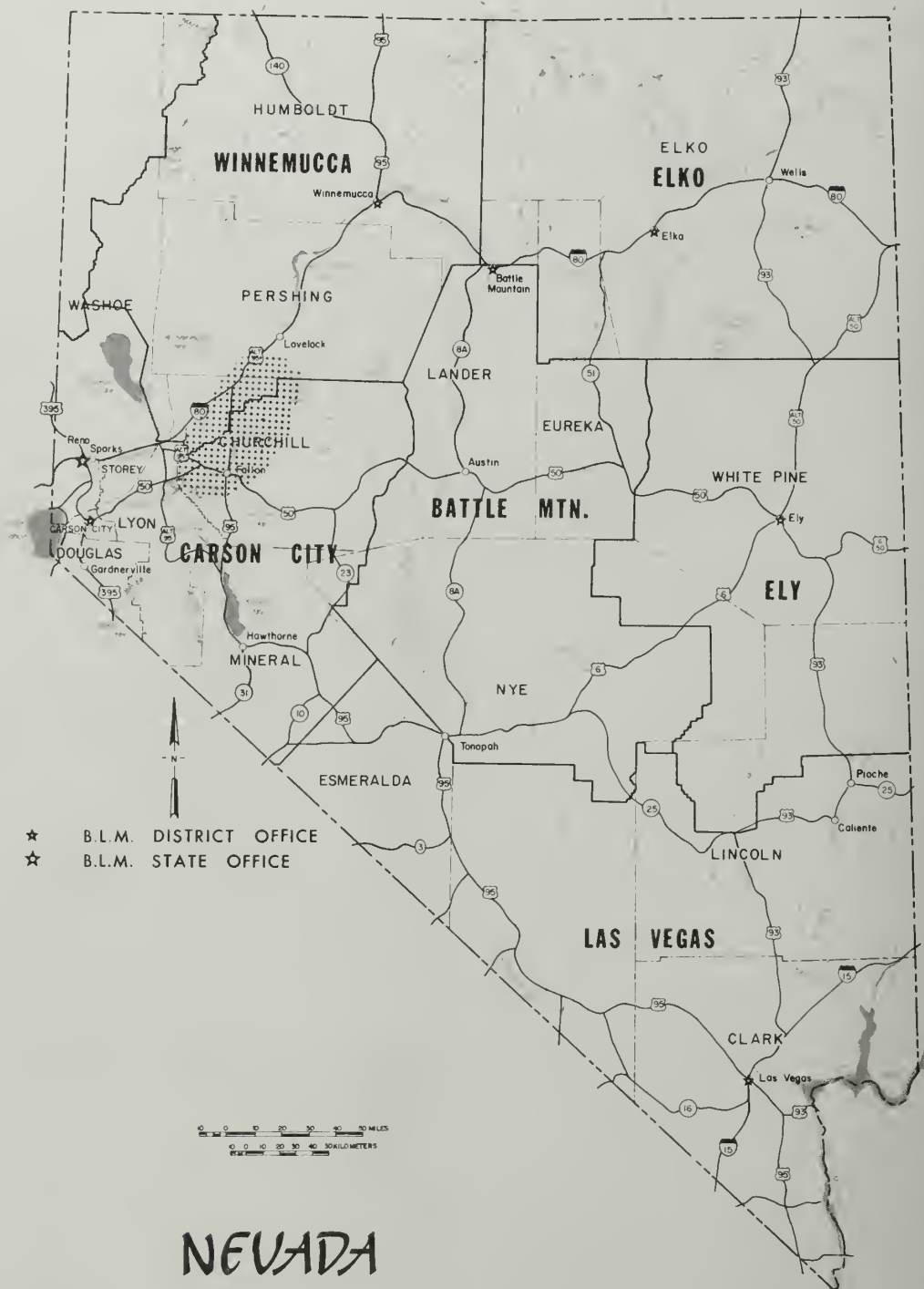
1981

DATE
LOANED

BORROWER

(Continued on reverse)

For



NEVADA